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ERYTHEA

A JOURNAL OF BOTANY, WEST AMERICAN AND GENERAL.

EDITED BY

WILLIS LINN JEPSON

AND OTHERS, OF THE DEPARTMENT OF BOTANY,

UNIVERSITY OF CALIFORNIA.

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1

CHAPTERS IN THE EARLY HISTORY OF HEPATICOLOGY.—III.

By Marshall A. Howe.

The Εχφρασις[1] of Fabius Columna is a work of some importance in the History of Hepaticology, inasmuch as we here find the beginning of the written history of three species, representing as many genera, namely, *Conocephalus conicus*, *Targionia hypophylla*, and a *Pellia* which Lindberg refers to *endiviæfolia* rather than to *epiphylla*. One page is given to good figuies of the plant described, rendering the determinations doubly sure. Columna describes Conocephalus in this manner:

"It arises on wet, shady rocks, especially those facing the north, and adheres by very fine silky roots, which are abundant under the leaves. The latter are a finger's breadth in width and twice that or more in length, green above or a little yellowish, scaly like the skin of a serpent or of a snail [Limax], a small elevated point being visible in the middle of each scale. It does not produce a flower so far as we have been able to observe unless it is identical with the fruit. It bears from the slightly cleft, sinuous, lunulate extremity of the leaf, a white, smooth, firm, juicy, diaphanous stem, of the thickness of a rush and four inches long, above which rests a small pileus like that of a fungus, divided below into five parts, under which the fruit is contained. The pileus is at first green, a little inclining to yellow, afterwards becomes yellow, and ends with being reddish; these lower divided parts bursting asunder show the black fruit and when opened the frnit falls as a black-purple dust, though it has hitherto been juicy and green. This sooty dust we have learned to consider as seed. It sends up its

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[1]Minus cognitarum rariorumque nostro cœlo orientium stirpium Εχφρασις; Rome, 1616. I am indebted to the courtesy of Mr. C. H. Wright of the Royal Gardens at Kew for a transcript of Columna's treatment of "Lichen" and to the Director, Dr. W. T. Thiselton-Dyer, by whose kind permission the extract was sent.

stalk in the month of March and is mature in April."[2] This, it hardly needs to be remarked, much excels any description of Hepaticæ that we have seen up to this time. The allusions to the areolæ and pores of the thallus and to the spore-dust are especially noteworthy. The paragraph has the heading "Lichen Plinii primus," to which title Columna adds the word "pileatus."

The Pellia, supposed by Lindberg to be *endiviæfolia*, is described under the heading "Lichen alter minor caule calceato ὑποδεδεμένω." It is said that "this delights in the same places and arises in a similar manner, but is smaller in every part, on account of which difference we have called it 'the less.' The stem is ὑποδεδεμένω, that is to say, *calceate*. It has a more delicate and smaller leaf, very thin, translucent, so that it is indistinctly seen in the shade; when it is older, it passes from purple to blackish. It is smooth and not squamous, but from the back something almost like a scabbard or *calceus*, with a fimbriate mouth, arises a little, from which at the Ides of March there springs forth a smooth, blackish-green little ball of the size of the chick-pea [Orobus]. This afterwards leaps upward, supported by a stem four fingers high; it is now a little lutescent and dehisces into a yellow flower of four leaflets, containing within a great quantity of very fine impalpable threads. The stem which was round, smooth, naked, juicy, diaphanous, white, and easily injured by the touch, falls to the ground on drying. The roots are silky-villous—none more delicate can be found. This plant is smaller by a fourth part than the one described above."

Targionia hypophylla is saluted as the "Lichen alter acaulis ὑποφυλλοκαρπος" and is described in words which we translate as follows: "This delights in a habitat like those of the former species and is met with at the same time in mossy places and others such as have been mentioned above. This kind is the smallest, for its leaves rarely equal in magnitude the nail of the little finger. It is green and is

[2]Op. cit., p. 332.

sprinkled over with whitish elevated points, so that it seems rough. In place of a flower preceding the fruit, it has on the lower part of the leaf, while it is yet small, cartilages on either side, purple, then black, set opposite to each other after the manner of ribs or valves. These you can raise with the edge of a knife; they differ from the leaf in that the latter is green. When, however, it is larger, the entire leaf grows from purple to black, swells at the extremity, and sends forth fruit of the same color, like that of Orobus in size, soft and filled with a watery whitish juice; afterwards it sends out something saffron-colored, the result of greater maturity. The black cortex being ruptured, a pericarp, as it were, contains the fruit, covered within by a yellow pellicle. This contains a yellow dust; yet the fruit is juicy if rubbed, and, this moisture being immediately dissipated by the heat of the finger, the infected finger is recognized by the yellow dust. The leaves adhere by very delicate and extremely short white fibrils."

In the "Prodromus Theatri Botanici"[3] of Caspar Bauhin is a paragraph on *Muscus fontanus* or *Hepatica aquatica*, in which the author states that these terms are applied in a triple sense. To the "greater and less" of Lobelius, Tabernæmontanus, and others, he adds a third called the "*Muscus fontanus* with racemose capitula." He describes it as having "far smaller leaves, pale green and somewhat hirsute, joined in the manner of scales, among which are brought forth very many naked capillary two-inch pedicels, each of which bears a small capitulum, compact like a raceme and rufescent," so far as he can conclude from a dry specimen sent by a correspondent whom he names. This plant is identified with Preissia by Lindberg. In the "Pinax"[4] of C. Bauhin, published three years later, under the chapter-heading, "Muscus Saxatilis vel Lichen" are listed nine supposed species of which the first seven are hepatic forms.

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[3]Basel, 1620. The copy consulted was of the second edition (1671), p. 152.

[4]Pinax Theatri Botanici; Basel, 1623. Page 362 in edition seen (1671).

The first three, *Lichen petræus latifolius sive Hepatica fontana*, *Lichen petræus stellatus*, and *Lichen petræus umbellatus*, all belong to *Marchantia polymorpha*. The others are the Preissia first described in the Prodromus and the three of Columna—Conocephalus, Pellia, and Targionia. C. Bauhin's list of five species is the most complete that we have met with up to this point.

John Parkinson in his "Theatrum Botanicum"[5] gives nearly two large quarto pages to descriptions and figures of "Liverwort." He recognized seven species, but, as the first two may be reduced to *M. polymorpha* and as the seventh is a lichen used for making purple dye, we have left but the five of C. Bauhin. Parkinson repeats Gerard's error of accompanying his first description of Marchantia with the figure of a *Sticta*. In his description of the smaller form of Marchantia—*Hepatica minor stellaris*—he says that "there is also another sort that beareth not divided leaves and the small stalks have round heads, not differing in any other thing from the last," which recalls Johnson's treatment of the male and female forms in the revision of Gerard's Herball. But, on figuring these forms, Parkinson transposes the names, calling the one with rays *Hepatica minor umbellatus* (apparently disregardful of grammatical endings) and that with "round heads" *Hepatica minor stellaris*—evidently a blunder of inadvertence, especially as others of a like nature occur in the work. He states that three of his hepatics are taken from Columna and a fourth from Bauhin, leaving Marchantia alone of which he had personal knowledge. Figures of Conocephalus and Pellia are subjoined, in addition to those of Marchantia alluded to above.

In Tomus III of the "Historia Plantarum Universalis"[6] of Johann Bauhin and Johann Heinrich Cherler, a page is given up to "Lichen sive Hepatica fontana." The authors indulge in a discussion of the Lichen of various predecessors,

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[5]London, 1640; pp. 1314-1316.

[6]Embrun, 1651; p. 750, Tomus III.

especially as the word was understood and applied by Platearius, Brunfels, Tragus, Lobel, and C. Bauhin, with no reference to the plants of Columna. They observe that Lobel and Tabernæmontanus give three figures but fail to show in what respect these forms differ. They make an advance in being inclined to reduce these three forms to a single species, without, however, giving any definite reason for so doing. A single figure of a fruiting Marchantia, resembling that of Fuchsius is appended. Why the Lichens of Columna are passed over in silence in a "Historia Universalis" is not clear. The authors could not have been ignorant of the work of Columna, for his hepatics or "lichens," as we have seen, find a place in the Pinax of C. Bauhin, which they quote.

In the years intervening between the brothers Bauhin and John Ray, there appeared three scientific works of varying degrees of importance, to each of which Lindberg traces the first description of a single hepatic. I have not had access to these three works and am thus indebted to Lindberg for my knowledge of their treatment of the Hepaticæ. The first of these was the "Pinax Rerum Naturalium Brittanicarum" of Chr. Merritt (London, 1667) in which is described a *Lichen capillaceus* identified by Lindberg as *Anthoceros punctatus*. In the historically well-known "Anatome Plantarum"[7] of Malpighi are figures and description of *Lunularia vulgaris*, and, according to Lindberg, there may be found also in the second volume of Sibbald's "Scotia Illustrata" (Edinburgh, 1684) a figure and short diagnosis of *Plagiochila asplenoides*.

During this century the compound microscope had come into use, and we have now entered upon an era of more exact knowledge of the structure and affinities of the lower plants. This advance becomes very evident in the works of that botanist and philosopher, John Ray. Book third of the first volume of his "Historia Plantarum"[8] is "about herbs with very minute seeds, flower either none or imper-

[7]London; vol. II, 1679.
[8]London; vol. I, 1686.

fect." "We divide this book," he says, "into two parts. The first will be concerned with stem-bearing herbs of this kind, the second with those wanting a stem and having hypophyllous seeds. These, moreover, are deservedly placed next to the preceding [fungi, algæ, sterile mosses, etc.], which are imperfect and destitute of seed, because these plants themselves were considered sterile and seedless not so long ago—before their seeds came into view by the assistance of the microscope." In the introduction to Part I., "concerning stem-bearing plants," he remarks: "Some species of Lichens do not produce caulicles, but their seeds arise in the leaves themselves, now in a lower, now in an upper part, which, nevertheless, we have thought ought not to be separated from the rest on this account, inasmuch as they agree in all the other known characters."

OBSERVATIONS ON THE COMPOSITÆ.—VIII.

By Edward L. Greene.

The discussion of "*Aplopappus*," now for some months interrupted, may be conveniently resumed after the recording of some observations upon certain types that were never referred to that genus.

In maritime subtropical North America, and to be more definite, on opposite shores of the Gulf of Mexico, grow two species of shrubby or suffrutescent plants, both of which have been referred by many botanists to *Solidago*. The one inhabiting the northerly and continental shore is *Solidago pauciflosculosa*, Michx. That of the opposite and insular stations is *S. Domingensis*, Spreng. The two are so much alike in general appearance that almost any botanist, even a specialist in the field of the Compositæ, if he were to trust his eyesight unaided by a lens, would quite possibly pro-

nounce the hebarium specimens of them to be all of a single species. But a lens reveals a marked difference in the superficial anatomy of the leaves, and a slight difference in the achenes, but this is all. That they are two excellent species of one genus, is likely to be the opinion of as many botanists as may be able to consider the question with unbiased mind; unless, perchance, a time shall come when histological characters, such as the inner structure of leaves, shall be deemed sufficient for the distinguishing of genera in default of any difference in flower or fruit. I enter this proviso here, because the venulation of the leaf-surfaces in these two plants is remarkably different, though neither in habit or peculiarities of floral structure, or character of fruit can anything more than specific differences be found.

These two subtropic maritime shrubs were, I think, never received as very welcome accessions to *Solidago;* and each of them has in turn been made the type of a distinct genus; and both the men who have thus dealt with one or both the plants were botanists of note and something of specialists in the Compositæ. Nuttall, who founded CHRYSOMA on the first species, did not know the second. Asa Gray, who knew both, suppressed CHRYSOMA by remanding its type to *Solidago*, and then elevated the second to the rank of a new genus under the name of *Gundlachia!* And this is not the worst of it. There is rather a classic sheet of herbarium specimens of "*Gundlachia*" which, both at the time of his publishing that synonym, and afterwards in the *Synoptical Flora*, he mistook for the other species, that is, for *Solidago pauciflosculosa.* It will be seen, by reference to the *Synoptical Flora*, that *S. pauciflosculosa* is credited to the Bahama Islands; but the sheet of specimens which furnished the author with his only basis for this statement is surely a sheet of "*Gundlachia.*" I shall speak of these specimens again.

As I have intimated in an earlier article,[1] *Solidago* must stand upon its habit and inflorescence. If these be not

[1] ERYTHEA, i. 56.

deemed sufficient to sustain it in generic rank, then it must go—as Dr. Kuntze says it must anyhow go—into *Aster*. No shrubs with cymose-corymbose inflorescence—probably no plants of any mode of growth with flat-topped inflorescence—are to be received into *Solidago*. Indeed, there are genera in plenty, belonging to other orders, which are distinguished by all botanists, on the ground of inflorescence alone. And these two shrubs of the Asteroideæ, so far out of harmony with the great body of *Solidago* species, must be admitted as the type of a genus, the name of which, by undisputed right of priority is CHRYSOMA; and the most genuine species are those now to be indicated.

1. **C. paucifloseculosa.** *Solidago pauciflosculosa*, Michx. Fl. ii. 116 (1803); Torr. & Gray, Fl. ii. 225; Gray, Syn. Fl. 161, in part, excluding the plant of the Bahamas. *Chrysoma solidaginoides*, Nutt. Journ. Philad. Acad. vii. 67 (1834) and Trans. Am. Phil. Soc. vii. 325. *Aster pauciflosculosus*, O. Ktze. Rev. Gen. 318 (1891). The most pronounced character of this species, as compared with the next, is the remarkable almost favose reticulation of the surface of the leaves. The only suggestions of an approach to this reticulation I find in some species of another set of maritime or subsaline shrubs, the Isocomas; but *Isocoma* is remarkably distinct from *Chrysoma* in the form of its corollas, and the characters of its achene and pappus. But the two genera must surely be looked upon as nearly related.

2. **C. Domingensis.** *Solidago Domingensis*, Spreng. Syst. iii. 369 (1826). *Gundlachia Domingensis*, Gray. Proc. Am. Acad. xvi. 100 (1880). More decidedly shrubby than the preceding; leaves acute, devoid of reticulation: rays white: achenes with little pubescence.

Var. **obtusifolia.** Apparently only suffrutescent: leaves narrowly oblanceolate, obtuse. Plant of the Bahama Islands.

From the genus *Solidago* as he limited it, these West Indian plants that make Asa Gray's *Gundlachia* are in no wise to be distinguished. They have, indeed, white rays; but

so has *S. bicolor*, which he did not remove from *Solidago*. And yet, the white rays were what he seemed to emphasize as the generic character. But he also mentions the shrubby habit and subcorymbose inflorescence as distinguishing marks; and in these respects, as I have said, *Gundlachia* is quite like one of the species that he left in *Solidago*; so very like it that, without a lens, he could not, in the herbarium, distinguish it from that species of "*Solidago*." But it is here worth recording that very early in his botanical career he did perceive and admit that the West Indian plant is congeneric with CHRYSOMA. On a sheet of specimens which, in 1840, he saw in the herbarium of Sir William Hooker—the sheet that is typical for my var. *obtusifolia*—he wrote: "This belongs to the section *Chrysoma* and is very nearly allied to *S. pauciflosculosa*, Michx. Is it not the *S. Domingensis*, Spreng.?—A. G." Doubtless in that early day when he had a reputation to make, he had examined his plant, and had perceived that it was not actually *S. pauciflosculosa*. But more than forty years afterwards, and one year subsequently to the proposing of *Gundlachia*, he wrote upon the same herbarium sheet, under his former note: "It is *S.* (*Chrysoma*, Nutt.) *pauciflosculosa*, Michx.—A. GRAY, 1881," thus reversing his earlier and right judgment upon these specimens. I can only suppose that in 1881 he looked at them but casually, and without a lens, and that so he was deceived by the mere general aspect and the outline of the leaves, which outline in these Bahama specimens is precisely that of *C. pauciflosculosa*, though they bear not the faintest suggestion of that remarkable reticulation which marks so distinctly every part of the leaf in this species of the United States mainland.

The shrubs thus brought into juxtaposition under the name *Chrysoma* have their nearest relatives on the Pacific side of the continent, and these are partly maritime and partly montane in their distribution. Only one of them has been named as a *Solidago* by any author. Two others are

near of kin to *Euthamia*, but are shrubby plants, with no ligulate corollas. They have entire punctate leaves, also the inflorescence of *Chrysoma*, and substantially the same involucre, achenes and pappus. I doubt not that they are naturally of this genus, and I here so place them.

3. **C. diffusa.** *Ericameria diffusa*, Benth. Bot. Sulph. 23 (1844). *Solidago diffusa*, Gray, Proc. Am. Acad. v. 159 (1861). *Aster Sonoriensis*, O. Ktze. l. c. 317 (1891). This plant is Mexican, inhabiting the territory adjacent to, and on both sides of, the Gulf of California. Its inflorescence is rather too flat-topped for a typical *Chrysoma*, and its ray-flowers more numerous, though few. Were it not shrubby, its place would be with *Euthamia*. But the two shrubs next following are at almost perfect agreement with the *Chrysoma* type in habit and inflorescence, though in them the proper ray-flowers are imperfectly or not at all developed.

4. **C. arborescens.** *Linosyris arborescens*, Gray, Bot. Mex. Bound. 79 (1859). *Bigelovia arborescens*, Gray, Proc. Am. Acad. viii. 640 (1873). *Aster arborescens*, O. Ktze. l. c. 315 (1891). *Ericameria arborescens*, Greene, Man. 175 (1894). Middle California, at low altitudes in both the Coast Range and Sierra Nevada. Achenes shorter and more pubescent than in *C. pauciflosculosa*, but not turbinate.

5. **C. Parishii.** *Bigelovia Parishii*, Greene, Bull. Torr. Club, ix. 62 (1882); Gray, Syn. Fl. 141 (1886). *Aster Parishii*, O. Ktze. l. c. 318. Decidedly glutinous as well as punctate, and with ampler foliage than the last, but otherwise most near it.—Confined to low mountains of southeastern California.

Into line with the last two fall several rather diminutive montane shrubs, some with radiate, others with discoid heads, namely:

6. **C. nana.** *Ericameria nana*, Nutt., Trans. Am. Phil. Soc. vii. 319 (1840). *Aplopappus nanus*, D. C. Eaton, Bot. King Exp. 159. Gray, Syn. Fl. 134, excl. var. *cervinus*. Like

Professors Eaton and Gray, I fail to distinguish from this the *E. resinosa* of Nuttall. The species is of the western part of the Great Basin, and is seldom collected. According to Nuttall the rays are not always well developed as ligules, and are ochroleucous rather than yellow, this last a point of affinity, as far as it has value, with the West Indian species.

7. **C. laricifolia.** *Aplopappus laricifolius*, Gray, Pl. Wright. ii. 80 (1852). *Aster laricifolius*, O. Ktze. l. c. 318. Plant of the southwestern interior, inhabiting rocky hills and low mountains; ligules both well developed and rather numerous.

8. **C. cuneata.** *Aplopappus cuneatus*, Gray, Proc. Am. Acad. viii. 635 (1873). *Aster cuneatus*, O. Ktze. l. c. 317. Middle and southern Sierra Nevada of Callfornia. Heads radiate.

Var. **spathulata.** *Bigelovia spathulata*, Gray, Proc. Am. Acad. xi. 74 (1876); *B. rupestris*, Greene, Bot. Gaz. vi. 183 (1881). More dwarf and compact than the type, and destitute of rays. Lower California, Arizona, etc.

The concluding series of species have a linear heath-like foliage, which gives them a rather peculiar appearance. Number 9 is the type of Nuttall's *Ericamera*, a genus maintained by Bentham and Hooker and some others; but I can can not separate this from those next preceding it in these pages, nor those from the typical *Chrysoma*. Numbers 9, 10 and 11 were ranged by A. Gray under his *Aplopappus* for the reason that they have ligules. The others were placed in his *Bigelovia* because rays were wanting. That they are most strictly congeneric does not seem likely to be called in question.

9. **C. ericoides.** *Diplopappus ericoides*, Less. Linnæa, vi. 117 (1831). *Aplopappus ericoides*, Hook. & Arn. Bot. Beech. 146 (1833). *Ericameria microphylla*, Nutt. Trans. Am. Phil. Soc. vii. 329 (1840). *Aster ericinus*, O. Ktze. l. c. 313. Shrub of seacoast sandhills in middle California; the leaves slightly pubescent.

10. **C. pinifolia.** *Aplopappus pinifolius*, Gray, Proc. Am. Acad. viii. 636 (1873). *Aster pityphyllus*, O. Ktze. l. c. 316. Taller than the last, and of the interior of southern California.

11. **C. Palmeri**. *Aplopappus palmeri*, Gray, l. c. xi. 74 (1876). *Aster Nevinii*, O. Ktze. l. c. Habitat of the preceding.

12. **C. teretifolia.** *Linosyris teretifolia*, Dur. & Hilg. Pac. R. Rep. v. 9. t. 7 (1855). *Bigelovia teretifolia*, Gray, l. c. viii. 644 (1873). *Aster Durandii*, O. Ktze. l. c. 316. Region of the Mohave Desert, in the mountains.

13. **C. paniculata.** *Bigelovia paniculata*, Gray, l. c. (1873). *Aster Asæ*, O. Ktze. l. c. 315. Of southern California and eastward.

14. **C. Cooperi.** *Bigelovia Cooperi*, Gray, l. c. 640. *Aster Cooperi*, O. Ktze. l. c. 317. Providence Mountains, in the Mohave Desert, California.

15. **C. brachylepis.** *Bigelovia brachylepis*, Gray, Bot. Calif. State Survey, i. 614 (1876). *Aster brachylepis*, O. Ktze. l. c. Mountains west of the Colorado Desert, California.

A somewhat recently discovered solidagineous herb of Mexico, a plant not far removed in nature from *Solidago rigida*, but with coroniform rather than capillary pappus, on account of a mere analogy of its pappus, has been published under the wrong genus. This, even though a monotype, should form a genus, and may be called

Stephanodoria tomentella. *Xanthocephalum tomentellum*, Robinson, Proc. Am. Acad. xxvii. 172 (1892). Typical *Xanthocephalum* has no pappus at all, but a turgid annulus instead; and the genus should be limited to those species, apparently. But neither the habit, the inflorescence, the involucre nor even the compressed achenes of this plant are at agreement with *Xanthocephalum* or any of its near allies.

An interesting far western plant which can ill be associated with the species of any recognized genus I name

Petradoria pumila. *Chrysoma pumila*, Nutt. Trans. Am. Phil. Soc. vii. 325 (1840). *Solidago pumila*, Torr. & Gray. Fl. ii. 210 (1842). *Aster pumilus*, O. Ktze. l. c. 319. Genus distinguished from *Euthamia* by its woody caudex and cylindric glabrous distinctly 10-striate achenes; and from *Chrysoma* by the same characters and by its flat-topped corymbose inflorescence. The species is strictly montane in its habitat, and occupies apparently a narrow belt running almost diagonally across the western part of the North American continent, from Texas to Oregon. It is found only in very stony ground or on bleak ledges. The Greek word for a *rock* combines with *Doria*, an early name for the Goldenrod, to designate suitably the genus.

There is a very natural group of species belonging to the mountains of Mexico and Central America, of which DeCandolle's *Aplopappus? stoloniferus* is the type, which wear so exactly the appearance of *Erigeron*, especially of the Japanese *E. Thunbergi* and the Californian *E. glaucus*, that I not long since published one of them under the name of *E. Heleniastrum.* But having now been privileged to examine at Kew, a good series of specimens, I find it necessary to abandon that opinion; not because the typical species looks less like true *Erigeron*, but because all exhibit certain characters of receptacle and achenes which are at variance with those of that genus as hitherto accepted. The achenes are apparently terete, quite pronouncedly silky, and are surmounted by a pappus rather too firm and too copious for *Erigeron;* and the receptacle is deeply alveolate. On these three or four technical characters, along with the external marks of *Erigeron* with yellow rays, these plants must needs be separated from that genus and from *Aplopappus;* and I assign the group the generic name

OSBERTIA.[1]

1. **O. stolonifera.** *Aplopappus? stoloniferus*, DC. Prodr. v. 349 (1836). *Aster stolonifer*, O. Ktze. Rev. Gen. 318 (1891). Slender herb, with long monocephalous scape, and equally long and slender leafy prostrate stolons: the whole plant hirsute, the leaves and involucres more particularly so, and almost hispid: radical leaves narrowed to a short and broad winged petiole.

2. **O. Heleniastrum.** *Erigeron Heleniastrum*, Greene, Eryth. i. 150 (1893). Plant stouter, not as tall, less stoloniferous, without hirsute pubescence, the involucre excepted: leaves ampler, thinner, tapering to a long and wingless petiole.

Var. **glabrata.** *Aplopappus stoloniferous.* var. *glabratus*, Coult. Bot. Gaz. xvi. 98. Stout, low, scarcely stoloniferous, almost glabrous; leaves of firmer texture.

Var.? **scabrella.** Of firm texture, scabrous and hirsutulous, dwarf and without stolons: bracts of the involucre broader, almost subulate, only hirsutulous: stout scapes barely 2 inches high. This is n. 3697 of J. Donnell Smiths' distribution of Guatemalan plants; probably a distinct species.

In a former article I concluded my observations on *Eriocarpum* by stating that certain species, presumably of that genus, were at that time too little known by me. I may therefore introduce them here.

E. blephariphyllum. *Aplopappus blephariphyllus*, Gray, Pl. Wright. i. 97 (1852). Having now seen specimens enough of Charles Wright's plant on which this species was founded, I am unable to comprehend what reason could be seen for combining it with *Aster gymnocephalus*. In aspect the two are most unlike each other; and the present plant has more the foliage, the habit and the inflorescence of *Grindelia inuloides*. I can not doubt that it is a most distinct species.

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[1] In commemoration of the high services rendered to Mexican botany by Mr. Osbert Salvin.

E. rubiginosum. *Aplopappus rubiginosus*, Torr. & Gray, Fl. ii. 240 (1843). An annual upright corymbose species, wearing much of the aspect of a *Grindelia*, but with the characters of *Eriocarpum*.

E. phyllocephalum. *Aplopappus phyllocephalus*, DC., Prodr. v. 347 (1836). A Mexican species not yet seen by me. Dr. Kuntze has united this and the preceding under the name *Aster phyllocephalus*.

MISCELLANEOUS NOTES AND NEWS.

THE NEWLY formed Department of Botany at Chicago University has for its head Dr. J. M. Coulter, "Professorial Lecturer in Botany," Henry L. Clarke, assisting.

ONE of the recent appointments in the U. S. Department of Agriculture is that of Victor K. Chesnut as Assistant in the Division of Botany. Mr. Chesnut is a graduate of the College of Chemistry, University of California, and in his student days employed vacation leisure to good purpose in botanical expeditions in the Coast Range and the Sierra Nevada. As a graduate student at Chicago University, his specialty was organic chemistry, an intimate knowledge of which is, we understand, invaluable in the special line of investigation assigned for his pursuit.

THE FILSON CLUB of Louisville, Kentucky, has announced as one of its forth-coming publications "The Life and Writings of Constantine Samuel Rafinesque," by Richard Ellsworth Call. This memoir, as stated in the Prospectus, had its genesis in an attempt by the author to clear up certain matters connected with the synonymy of a group of freshwater mollusks. In this manner much was incidentally learned concerning the personality of Rafinesque, and the conclusion was reached as the work proceeded, that Ameri-

ca's most eccentric, albeit versatile, naturalist had not always been fairly treated by his contemporaries. There resulted further the conviction that many naturalists now living have formed opinions concerning the nature and value of his work which appear to Dr. Call to be quite erroneous. The volume will include a complete bibliography of Rafinesque's writings containing over four hundred titles, together with a certified copy of his will, "one of the most remarkable testamentary documents ever probated."

THE RECENT attempt to cut down the area of the national forest reservations should serve as a warning to every unmercantile Californian. It is plain that the Yosemite and other reservations are not secure so long as there are men in Congress with such lack of calibre as Representative Bowers. The plea made that portions of the reservations are capable of being applied to agricultural uses convicts the utterer of it of inanity. Rocks and cliffs are well enough in their way, but something more is needed for a forest reservation. The Government has in California only enough for the nucleus of a national forestry system, and it is insistent that the King's County and other reservations be not diminished. If the sheep and lumber men were given license there would not be a shrub or pine or single specimen of *Sequoia gigantea* left in the whole length of the Sierras. The proposition to empower the Secretary of the Interior with the approval of the President to reopen to settlement such portions of the reservations as he may see fit is designed to benefit only the corporations and stock-men of insatiate greed. Proponents of forestry, as well as lovers of the High Sierras, should interest themselves herein personally. They can write to the representatives from their districts setting forth such facts as may be within their reach.

PRINCIPAL BOTANICAL WRITINGS OF

PROFESSOR GREENE.

NEW SPECIES OF PLANTS FROM NEW MEXICO. Four papers in *Botanical Gazette*, Vol. vi., 1881.

NEW PLANTS of CALIFORNIA, ARIZONA AND MEXICO. Nine papers in *Bulletin of the Torrey Botanical Club*, Vols. ix. and x., 1882-83.

STUDIES IN THE BOTANY OF CALIFORNIA AND PARTS ADJACENT. Six papers in *Bulletin of the California Academy of Sciences*, Vols. i. and ii., 1885-87.

BIBLIOGRAPHICAL NOTES ON WELL KNOWN PLANTS. Ten papers in *Bulletin of the Torrey Botanical Club*, Vols. xiv.—xvii., 1887—90.

PITTONIA. A series of Eighty-Seven Papers, in Two Volumes, pp. 617, 1887-92. Published by the author. Price $2.50 per volume.

ILLUSTRATIONS OF WEST AMERICAN OAKS. One Volume, 4to, pp. 79, with Thirty-Seven Plates, 1889-90. Published under the patronage of James M. McDonald, of the Pacific Bank, San Francisco.

FLORA FRANCISCANA. An attempt to classify and describe the Vascular Plants of Middle California. Parts i., ii. and iii. (pp. 352, 1891-92) finished. Price $2.00.

MANUAL OF THE BOTANY OF THE REGION OF SAN FRANCISCO BAY. A Systematic Arrangement of the Higher Plants growing Spontaneously in the Counties of Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo and San Francisco, in the State of California. One Volume, 8vo., pp. xiii., 328, 1894. Price of library issue, $2.00; of school issue, single copy, $1.75.

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NOVITATES OCCIDENTALES.—X.

By Edward L. Greene.

Vicia semicinecta. Stoutish, very leafy, probably several feet high, the stem very prominently striate-angled and puberulent: leaflets 20 to 24, approximate, about 1 inch long, oblong-linear, mucronate, glabrous above, beneath silky-puberulent: peduncles far surpassing the leaves, the flowers probably in a short and dense raceme: pods obliquely oblong-linear, less than $\frac{3}{4}$ inch long, glaucescent, not blackening in maturity, few-seeded: seeds globose, $1\frac{1}{2}$ lines thick, dull black, nearly half encircled by the hilum.

A most interesting species, manifestly allied to *V. gigantea*, but pods and seeds widely different; the flowers unknown. Collected in southeastern Oregon, on Crane Creek, by Mrs. R. M. Austin, 1893.

Lupinus Tidestromii. Stems slender, decumbent, a foot long, from fleshy-fibrous perennial yellow roots; herbage silvery-silky throughout with a dense appressed pubescence: leaflets mostly 5 only, oblanceolate, acute: racemes rather short, on long and slender peduncles, the distinct whorls of flowers about 4 or 5: calyx villous rather than silky: corolla $\frac{1}{2}$ inch long, blue except a white spot on the banner, this changing to red; petals subequal; keel quite narrow, naked except a few villous hairs on the margin towards the apex.

This is the *L. littoralis* of my *Flora Franciscana* and *Bay Region Manual;* though I never felt at all confident of its being the true *L. littoralis.* An examination of the originals of that species has placed it beyond all doubt that this plant of the middle Californian shores is entirely distinct. The description is drawn from specimens collected recently by Mr. Ivar Tidestrom, at Pacific Grove, near Monterey.

Trifolium Hanseni. Perennial by many slender interlacing roots and rootstocks, the almost filiform sparingly leafy stems only 2 to 4 inches high: lowest leaflets from

cuneate-obcordate to obtusely-obovate: the upper oblanceolate, acute and mucronate, the margins of all denticulate or serrulate, the shortest 2 lines, the longest 5 lines long, the lowest glabrous, the uppermost often with a long silky pubescence beneath: filiform peduncle mostly solitary and appearing terminal; head round-ovoid, ½ inch high: calyx-tube subcylindrical, 10-nerved, glabrous, not quite half as long as the subulate-aristiform slender teeth, these glabrous in age, but in bud clothed with long villous or silky hairs.

High Sierra in Alpine Co., California, Geo. Hansen, 1892. A fine new ally of *T. longipes;* rather diminutive.

Trifolium Arizonicum. Annual, branching, the branches a foot long, ascending, stoutish and slightly fistulous, somewhat flexuous, the internodes short; whole plant glabrous: leaves short-petioled; leaflets an inch long, linear and linear-lanceolate, spinulose-serrulate: peduncles 2 or 3 inches long: heads globose, about 8 lines in diameter, involucrate: calyx-tube campanulate, 10-nerved; teeth subulate, aristate-pointed, little exceeding the tube in length, strongly 1-nerved.

Known only from specimens collected near Flagstaff, northern Arizona, by Dr. H. H. Rusby in 1883. Species related to the Californian *T. tridentatum*, but a plant of peculiar aspect, and very marked characters of calyx.

Thermopsis argentata. Rather slender, a foot or two in height; all the growing parts, and when young the whole plant silvery-canescent throughout with a very dense and minute silky pubescence, the mature parts also not indistinctly silky and pale: stipules ½ to 1½ inches long, from broadly to narrowly lanceolate and often slightly falcate: leaflets of the lowest leaves obtusish and of narrowly cuneate-obovate outline, of the upper from oblanceolate to rhombic-obovate and very acute: raceme short and rather few-flowered: calyx-teeth triangular-subulate and about as long as the campanulate tube: petals of the wings and keel notably longer than the banner: pods long, spreading, silky-tomentulose.

Modoc County, California, Milo S. Baker, 1893.

Thermopsis velutina. *T. Californica*, var. *velutina*, Greene, Eryth. i. 81. Stouter than *T. Californica* and much smaller, in maturity densely villous-tomentose throughout, the pubescence of only the younger or growing parts more appressed and somewhat silvery-silky: stipules often larger than the leaflets, 1½ inches long, obliquely ovate and obtusish or ovate-lanceolate: leaflets from narrowly to broadly and somewhat rhomboidly ovate, mostly acutish: racemes short and short-peduncled: ovaries densely white-tomentose.

The plant was first made known to me, and imperfectly, from Mt. Hamilton, which must be its northern limit; and it now proves to be frequent five hundred miles to the southward, in the mountainous parts of San Diego Co., Calif. It is certainly quite distinct from *T. Californica.*

Ranunculus Populago. Stem solitary from a fascicle of fibrous roots, erect, leafy, the whole plant flaccid and glabrous, about 6 to 10 inches high: leaves thin-membranaceous, from round-reniform to cordate-ovate, obtuse, entire or obscurely crenate, on long petioles; the cauline smaller, ovate and ovate-lanceolate, sessile: peduncles many, slender, surpassing the cauline leaves to which they are axillary: flowers yellow, ⅓ inch broad; petals 5 or 6, obovate-oblong: heads of rather numerous thick short-pointed achenes small, globose or depressed-globose.

A somewhat rare plant of the mountains of eastern Oregon and adjacent Idaho, distributed by Mr. Cusick and others under various names, but a very well defined new species, resembling a diminutive *Caltha palustris;* but the plant is not aquatic.

Ranunculus eximius. Near *R. adoneus*, but radical leaves very few, often 1 only, on a short stout petiole 1—2 inches long, the blade of cuneate-obovate or almost flabelliform outline, deeply about 7-lobed at the broad summit, otherwise entire; upper cauline leaves sessile, broadly cuneiform, 1 inch long, cleft to the middle into about 5 lanceolate or broadly linear lobes: periphery of the expanded

large corolla quite circular by the overlapping of the numerous broadly obovate or almost obcordate yellow petals.

A most beautiful alpine or subalpine species of the Rocky Mountains in Colorado, Wyoming, and Idaho, apparently somewhat rare, but gathered sparingly, and in poor specimens even by Hall and Harbour, in whose collection it is mixed with *R. adoneus* as far as distributed. Better specimens have been obtained by Mr. Buffum of Laramie.

Ranunculus Missouriensis. Stems slender, decumbent, rooting at the lower joints, very leafy: leaves ample, 2 inches broad, scarcely as long, short-petioled, triternate, *i. e.* divided into 3 cuneate-flabelliform parts, these ternately parted and their segments deeply cleft: inflorescence terminal, naked or small-bracted, of a few slender peduncles: petals round-obovate, 1½ lines long: head of achenes oblong-ovoid; achenes small and long-beaked, the body more than half encircled by a very prominent callous margin.

A Missouri species, distributed by Mr. Bush. Manifestly allied to the common yellow-flowered water crowfoot, but very distinct by its broad geranium-like leaves and much elongated head of achenes.

Erigeron oxyphyllus. Erect, 2 feet high or somewhat less, from a suffrutescent base; stems stoutish, simple up to the somewhat fastigiate rather small corymb, striate-angled, the whole plant glabrous: leaves 2 or 3 inches long, linear, acute at both ends, rather few and scattered, those of the branches of the corymb reduced to subulate and somewhat appressed bracts: heads hemispherical, 4 lines broad and nearly as high; bracts of involucre much imbricated, very slenderly subulate, obscurely glandular-puberulent.

An uncommonly well marked species of Arizona, collected near Yucca, 1884, by Mr. Marcus Jones and distributed as *E. peucephyllus*, to which species it does not bear resemblance in any way.

Erigeron Covillei. Erect, 1 to 1½ feet high from a deep seated perennial root or rootstock; stem very rigid and

brittle, abundantly leafy below, the leaves diminishing upwards, all linear, plane, obtuse, and with the whole plant canescently hispidulous: heads in a very lax terminal corymb; bracts of involucre in 2 or 3 series moderately unequal; rays rather few and broad, violet.

Species in some sort intermediate between *E. Breweri* and *E. foliosus*, but specifically different from both. It is Mr. Coville's n. 931, from the Coso Mountains in eastern California, distributed to several herbaria though not enumerated in the published list of Death Valley Expedition plants.

Erigeron Hartwegi. Stems erect, a foot high, tufted and from a perennial perpendicular root, neither brittle nor notably rigid, equally leafy up to the corymbose cluster of 3 to 7 rather large heads; pubescence of the whole plant quite scanty and strigose, with nothing of the hispid or scabrous: leaves ascending: leaves linear, with strong midvein and a very narrow revolute margin: heads $\frac{3}{4}$ inch broad including the numerous and rather broad pale bluish-purple rays; involucre minutely scabrous and strigose, the bracts in 2 slightly unequal series.

Common among the foothills of the Sierra Nevada, California, to the northward of Sacramento, east of Marysville, etc. First collected by Hartweg; afterwards by Fremont, Bigelow, and by the present writer.

Erigeron petrocallis. Stems tufted from a suffrutescent base, only a span high, slender, rather rigid and brittle, somewhat corymbosely branching from below the middle, or the smaller simple and monocephalous, only sparsely leafy; herbage green but clothed throughout with a short and very rigidly hispidulous pubescence which is distinctly retrorse on stem and branches, as often upon the foliage also: leaves oblong-linear, or the lowest spatulate-oblong, less than an inch long, obtuse, sessile by an obtuse base, the uppermost reduced to small bracts of similar outline: heads hemispherical, $\frac{3}{4}$ inch broad including the rays; bracts of involucre nearly glabrous, in 2 not very unequal series; rays broadish, 30 or more to the head, violet.

Crevices of perpendicular rocks, in shaded cañons of the West Humboldt Mountains, Nevada, collected by the author, in July, 1894.

Pyrrocoma subsquarrosa. Stems several from a thick somewhat fusiform root, more or less decumbent, 5 to 9 inches high, bearing at summit 3 or 4 racemosely disposed heads or a single terminal one; herbage, especially the stem and lower face of leaves, canescently tomentulose: leaves lanceolate, petiolate, from nearly equalling to quite surpassing the stem and inflorescence, very conspicuously spinulose-serrate: heads 1 inch high, rather narrowly campanulate; outer bracts of the involucre linear-lanceolate, saliently spinose-serrate; inner ones spatulate-dilated above the middle and this part with subcartilaginous or subscarious margin, the apex an herbaceous recurved cusp: achenes lanceolate, distinctly tapering at each end, and of a glossy light-green hue.

Plant like *P. Cusickii* in some respects, but approaching the Homopappus section in others. The subsquarrose involucre is a new character in true *Pyrrocoma*. The specimens are from Wyoming, collected by Mr. J. N. Rose, 1893.

Senecio lynceus. Related to *S. Fendleri*, but plants solitary (*S. Fendleri* being clustered or matted), 1 to 1½ feet high, very leafy at base, the stem branching from near the base, all the branches flowering: herbage loosely and floculently white-tomentose, often glabrate in age: all except the lowest radical leaves (these often quite lyrate) bipinnately parted into many small acute lobes, the texture thickish but rather fleshy (not coriaceous as in *S. Fendleri*): stem and branches bracted, not leafy, ending in an unequal-rayed cymose corymb of small broadish radiate heads.

Common on dry bushy hills of northern Arizona and adjacent Utah and Nevada. Usually referred to *S. Fendleri* but very distinct. Rusby's specimens, from Lynx Creek, Arizona, well represent the species, though it is a variable one.

γ = S. cyparissoides Nutt.

Senecio streptanthifolius. Only a foot high, or even less, from clustered leafy perennial stocks, glabrous throughout, somewhat fleshy-coriaceous and glaucous: leaves 1 to 1½ inches long, orbicular to obovate and oblong-obovate, rather long-peduncled, the margin from merely repand-denticulate to more conspicuously though sparingly toothed: heads less than ½ inch high, in a loose unequally-branched corymb terminating the remotely bracted stem: both disk and ray flowers very light yellow.

On dry wooded banks in Beaver Cañon, Idaho; collected sparingly, and almost out of flower, by the writer, in August, 1889, and distributed under the wrong name of *S. rapifolius*, Nutt., to which species it is not at all related.

Senecio admirabilis. Tall, stoutish, glabrous, simple and equaby leafy up to the corymbose inflorescence of large radiate heads: leaves broadly linear-lanceolate, 5 to 8 inches long, subsessile, very evenly and saliently serrate, heads nearly an inch high, only 10 to 15 in the corymb.

Species of some rarity, and found only in the higher mountains of Colorado. It has been referred to *S. andinus*, Nutt., a plant of wholly different aspect, with ample panicle—not corymb—of 100 or more heads, and these scarcely a third as large as in the present plant. On several accounts *S. admirabilis* were as easily referable to *S. triangularis*. It is really less unlike that, but is perfectly distinct from it and also from everything else that has been called either *S. andinus* or *S. serra*.

Agoseris dens leonis. Scapes mostly solitary, 8 to 12 inches high, from a slender and simple perennial root: leaves few, erect, 3 or 4 inches long, oblanceolate, obtuse, the margin conspicuously runcinate-toothed except toward the apex: scape, and also the midvein of the leaves beneath, sparsely clothed with fine wooly-villous hairs: head an inch high, ligules ample, light yellow, drying pinkish: pappus copious and remarkably firm, sessile at the summit of the merely narrow-necked (not filiform-beaked) achene.

Plentiful on grassy slopes near the summits of the West Humboldt Mountains, Nevada, collected by the writer in July, 1894. Allied to *A. glauca*, though no part of the plant is glaucous, the whole herbage being of a vivid green; the runcinate leaves quite like those of some *Hypochæris*, or even suggesting those of *Taraxacum*.

Phacelia inconspicua. Annual, erect, rather widely and freely branching, only 2 to 6 inches high, very leafy and the leaves far surpassing the dense small-flowered spikes: herbage rather softly pubescent, but the sepals setose-hispidulous: leaves all entire, spatulate-lanceolate and more or less distinctly petiolate; sepals elongated-linear, some notably dilated at the apex: corolla wholly inconspicuous, hardly more than a line long, broad-funnelform, white or with a very dull bluish tinge: stamens not exserted: seeds 4, minutely favose.

A curious and very distinct but homely ally of *P. humilis*, altogether insignificant and weedy-looking by contrast with it where both grow in abundance on the slopes of the West Humboldt Mountains, Nevada, the new one at a higher altitude than the other.

Linanthus neglectus. Stem only 2 to 5 inches high, with 1 or 2 long upper internodes and as many very short lower ones, simple to near the summit where the proper terminal glomerule of flowers is overtopped by a pair of long peduncled lateral ones; pubescence sparse and gland-tipped on the stem, the leaves hispid-ciliate, their segments about 5: corolla with very slender tube well surpassing the long linear-acerose calyx-teeth; its rotate limb about 3 lines broad, the segments quadrate-obovate, truncate or retuse, yellow at base, the yellow bounded by 5 transverse bars or semilunate spots of vermilion, the rest rose-red: capsule obovoid, 3-seeded.

Common at subalpine elevations of the Californian Sierra, and associated with *L. Harknessii*, but a species of the Leptosiphon section, most related to *L. ciliatus*.

CHAPTERS IN THE EARLY HISTORY OF HEPATICOLOGY.—IV.

By Marshall A. Howe.

On page 124 of the first volume of Ray's Historia begins the chapter on "Lichen." He describes eight supposed species here. He considers the *Hepatica terrestris vulgaris* or the "Lichen" of the shops to be the same as the *Lichen pileatus* of Columna, and he therefore makes use of Columna's description, inasmuch as it accords exactly with his own observations. But Columna's *L. pileatus* was Conocephalus, and while the "Lichen of the shops" in Ray's time may have been mostly of this genus, the *Hepatica fontana* of J. Bauhin, which he quotes among the synonyms, was surely Marchantia. But under numbers two and three he brings in the male and female forms of Marchantia as distinct species—the *Lichen petræus umbellatus* and *Lichen petræus stellatus* of C. Bauhin—and notes that J. Bauhin does not distinguish between the latter and the common Lichen. Toward the close of the description of the *stellatus*, he says: "However it may be concerning the *Lichen terrestris vulgaris*, whether it should be considered that of the stellate fruit or that of the pileate,—I am in no doubt at all that these two [*i. e.*, the stellate and pileate] are indeed different in species." Thus we see that Ray, recognizing the necessity of distinguishing between Conocephalus and Marchantia, which had probably been somewhat confused by the shop-keepers of the time, erred in not listening to those of his predecessors who had made approaches to the truth in regard to the sexes of Marchantia. Yet, it is, perhaps, what would be expected of a careful observer until the true significance of the male plant should have been clearly demonstrated.

The seventh species described here is the "Lichen sive Hepatica lunulata, *επιφυλλοκαρπος*." Of this it is remarked: "The leaves are smaller and shorter than those of the *Hepatica vulgaris* of the druggists, and they are not so manifestly

punctate; they are sinuate along the margins and as if crisped. In the middle of the leaves and now and then toward their margins, certain foliaceous *lunulæ* projecting above the surface of the leaf come forth, which hold the seeds, crowded together in the cavities and lying on the back of the leaf. In the spring, after the seed has matured, the *lunulæ* vanish. It occurs in shady and moist places, but somewhat rarely. Mr. Dale, pharmacist and physician of Braintree, our neighbor and a zealous botanist, first detected it and showed it to us growing not far from our house; and elsewhere still more abundantly." In one of Ray's later works, Mr. Dale's name is written after the phrase-name quoted above as if he were the author of it, though he appears here simply as the discoverer of the plant. This, without doubt, was Lunularia, first described by Malpighi; yet, in the third edition of Ray's "Synopsis Methodica Stirpium Britannicarum"[1] (augmented and revised by Dillenius), where the stellate, umbellate, and gemmiferous conditions of *M. polymorpha* are definitely pronounced to be one and the same plant, it, also, is mentioned as a form of the same thing. The eighth hepatic in this series is the "Lichen minimus foliolis laciniatis," which Ray afterward declared to be simply a sterile form of Columna's *Lichen caule calceato*. The fertile state of this, Ray had already recognized, so that the eight supposed species reduced themselves to six, the two not already mentioned being—to place them in present-day genera—Targionia and Preissia. In the "Catalogus Plantarum Angliæ,"[2] published sixteen years before this first volume of the Historia, Ray includes the hepatics now called Marchantia, Conocephalus, and Pellia, but makes no remarks about them that we need to notice here.

The first edition of Ray's Synopsis[3] we have not seen, but Lindberg finds here the descriptive phrases, *Muscus*

[1] Op. cit., p. 115.
[2] Op. cit., p. 192.
[3] Synopsis Methodica Stirpium Britannicarum; London, 1690.

trichomanoides purpureus, *alpinis rivulis innascens*, and *Muscus muralis platyphyllos*, which he associates with *Pleurozia purpurea* and *Porella platyphylla*, respectively. The second edition (1696) of the work just mentioned is the most important yet met with as a starting point for hepatic species. In the body of the work, under "Lichen," are described eight distinct species, four of them new ones, and in the Appendix, under the name "Muscus," Mr. Samuel Doody, a London pharmacist, lists three others for the first time. Among the Musci, too, in Ray's portion of the book, are at least three sterile plants that may be recognized as Hepaticæ (*Porella platyphylla*, *Plagiochila asplenoides*, and *Pleurozia purpurea*), thus bringing the total number of species of this class up to fourteen. Of the new ones, the first[4] is a *Lichen minimus albescens*, further described, if we may presume to transform Ray's elegant Latin into English, as "creeping by little stems, leaves pinnate, capitula black, shining. The capitula are seated upon half inch pedicels and are perfectly spherical; finally, they are opened into four petals, as it were, and imitate flowers." It is found on moist banks. "Although this," he continues, "has a certain creeping caulicle clothed with leaves pinnately attached, we have subjoined it to the preceding [Pellia] on account of its conformity in capitula." Here then we have the relationship between the foliose and thalloid Hepaticæ established! Lindberg believes this to be *Diplophyllum albicans*, though Micheli identified[5] it with the plant which, by general consent, has been considered to be *Kantia Trichomanis*. But Ray's description of the capsule should exclude Kantia from the list of possibilities.

It is not difficult to believe that the *Lichen minimus*, "with venose leaves, advancing by dividing twice or thrice," may be *Riccia glauca*. This Ray found in his garden—had not at the time of writing observed in what way it bore its seed. The *Lichen terrestris*, "supine, very small, dicho-

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[4]Op. cit., p. 41.

[5]Nova Plantarum Genera, p. 8.

tomous, with oblong segments, creeping among mosses, observed in Ireland by Mr. Sherard," is referred by Lindberg to *Metzgeria furcata*—a determination that can scarcely be questioned, at least so far as the genus is concerned. A *Lichen parvus*, "creeping on the moist bark of trees, with subrotund leaflets incumbent in the manner of scales," may easily be *Radula complanata*, as determined by the same author. "From the extreme leaflets or scales," in this, "arise very short and slender pedicels sustaining subrotund capitula, which, dehiscing into four segments, resemble little tetrapetalous flowers, of a reddish color." In addition to these already specifically mentioned, our older friends, Marchantia, Conocephalus, Pellia, and Lunularia, have a place here; also a *Lichen verrucosus*, which was probably a male Conocephalus, and a *Lichen seminifera pyxide folio adnascente Julo pediculo longo insidente*, gathered on the walls of the old church in the Savoy, which Mr. Doody, a friend of Ray's and "a botanist of the first rank, not only very diligent in seeking out plants, but also most acute in discerning their differences and distinguishing species,"[6] considered to be a form of *M. polymorpha*.[7] Then there are the three species of Mr. Doody in the Appendix of the second edition of the Synopsis (p. 339). The first of these is "the narrower *Muscus lichenoides*, with leaves incumbent upon the stem in the fashion of scales." He says this is nearest the tenth species described by Ray (supposed to be *Radula complanata*) but the branches are two or three times narrower. The second is "the greater *Muscus lichenoides* with pinnate bifid leaves," and the third, "the less *Muscus lichenoides* with pinnate bifid leaves." In all these a capitulum arises from a little tube seated on the leaves and finally dehisces into four parts. These brief diagnoses have been traditionally interpreted as applying respectively to *Frullania dilatata*, *Lophocolea bidentata*, and *Cephalozia bicuspidata*.

[6]Ray, Syn. Meth. Stirp. Brit., p. 327, ed. II.
[7]Ray, Syn. Meth. Stirp. Brit., p. 115, ed. III.

Before the year 1700, there were issued four other botanical works having some little reference to the Hepaticæ. In Plukenet's "Almagestum Botanicum" (London, 1696) there appears, in the usual list under the head of "Lichen," a short description which Lindberg applies to *Pellia epiphylla*, and another, accompanied by a figure, which is quoted by Linnæus[8] in the synonymy for the hepatic we now call *Aneura pinguis*. The identification of this latter plant of Plukenet's is somewhat doubtful and it is ignored by Lindberg. In the "Histoire des Plantes——de Paris"[9] of Tournefort, Lindberg finds mentioned a *Muscus palustris, Absinthii folio, insipidus* which he thinks to be *Trichocolea tomentella*, and in James Petiver's "Musei Petiveriana" the Swedish bryologist discovers a description and figure of *Ricciella fluitans* and description alone of *Ricciocarpus natans*. Petiver credits the authorship to Buddle, whose herbarium containing 28 species of Hepaticæ is now preserved in the British Museum.[10] Jacob Bobart (the son) in the third part of Morison's "Plantarum Historia Universalis" gives a list of twelve supposed species[11] of "Lichen," remarkable chiefly for confusion in synonymy. Later in the same work (p. 627), several hepatics are described as Musci. Two of these, pronounced by Lindberg to be *Mylia Taylori* and *Jungermannia riparia*, make their first appearance here. Lindberg's determinations may sometimes seem to hang upon slender threads, but when we consider his wide acquaintance with hepatic forms, the acuteness of his critical powers, and the fact that he carefully studied the herbaria of Buddle, Dillenius, and others, we must at least receive his opinions with much confidence. Between the year 1699 and the time of Linnæus, the classical works of Tournefort, Dillenius, Ruppius, Vaillant, and Micheli were

[8]Species Plantarum, p. 1136, ed. I.

[9]Paris, 1698.

[10]See article entitled, "The Mosses in Buddle's Hortus Siccus," Journal of Botany, vol. III (new series), 1874, p. 36.

[11]Robert Morison, Plantarum Historia Universalis Oxoniensis, Pars tertia, p. 622; Oxford, 1699.

given to the world. In these many species of Hepaticæ were published. Ruppius first used the name Jungermannia and Micheli established several of the hepatic genera recognized at the present day. But the works of these authors are better known.[12]

NOTES ON WESTERN LICHENS.

By Dr. E. Stizenberger.

Mr. Robert Reuleaux having kindly favoured me with a small collection of Lichens gathered during his travels through the United States, and comprising specimens from Yellowstone Park and Monterey, California, as well as from Sitka in Alaska—some of them never found in America before—I made the above mentioned cryptogams the subject of my special study, the results of which are laid down in the following list, intended to serve as a supplement to the late Prof. Tuckerman's Synopsis of North American Lichens.

1. *Sphærophoron coralloides*, Pers.; Tuck. New Engl. 82. Sitka.

2. *Bæomyces icmadophilus* (Ehrh.) Nyl.; Tuck. Syn. ii. 7, 8. On dead wood, Sitka.

3. *Cladonia fimbriata*, var. *tubæformis* (Hffm.) Nyl.; Tuck. Syn. i. 241. Sitka.

4. *Cladonia bellidiflora* (Ach.) Schær.; Tuck. Syn. i. 252. Sitka.

5. *Cladina rangiferina* (L.) Nyl.; Tuck. Syn. i. 248. Sitka.

6. *Ramalina ceruchis* (Ach.) DN., var. *cephalota*, Tuck. Syn. i. 21. On dead twigs of shrubs, Monterey, Calif.

7. *Ramalina reticulata* (Noehd.) Krmplh.; Tuck. Syn. i. 22. Sitka; Monterey, Calif.

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[12] I wish here to acknowledge my indebtedness, in the preparation of these historical notes, to Professor Greene, both for the use of his valuable library and for helpful suggestions.

8. *Ramalina farinacea* (L.) Ach.; Tuck. Syn. i. 25. Sitka.

9. *Ramalina pollinariella*, Nyl. Sterile, Sitka.

10. *Alectoria sarmentosa*, Ach.; Tuck. Syn. i. 45. Sterile, Sitka.

11. *Alectoria prolixa* (Ach.) Nyl. A. jubata, var. implexa, Tuck. Syn. i. 44. Fertile, Sitka.

12. *Chlorea vulpina* (L.) Nyl.; Tuck. Syn. i. 38. Sterile, on dead wood, Yellowstone Park.

13. *Platysma lacunosum* (Ach.) Nyl.; Tuck. Syn. i. 35. Sterile, Sitka.

14. *Parmelia sulcata*, Tayl.; Tuck. Syn. i. 59. On trees, Sitka.

15. *Parmelia vittata* (Ach.) Nyl.; Tuck. Syn. i. 60. Fertile, on twigs of trees, Sitka.

16. *Parmelia enteromorpha*, Ach.; Tuck. Syn. i. 60. Fertile, evernioid, Sitka.

17. *Stictina scrobiculata* (Scop.) Nyl.; Tuck. Syn. i. 102. Fertile, Sitka.

18. *Sticta pulmonaria* (L.) Ach.; Tuck. Syn. i. 94. Fertile, Sitka.

19. *Nephroma arcticum* (L.) Fr.; Tuck. Syn. i. 103. Sitka.

20. *Physcia lychnea* (Ach.) Nyl.; Tuck. Syn. i. 50. On bark, Sitka.

21. *Physcia lychnea*, var. *pygmæa* (Bor.) Nyl.; Tuck. Syn. i. 51. Upon granite rocks, Sitka.

22. *Physcia lychnea*, var. *laciniosa* (Schær.) Stzb. Helv. No. 305. Thallus red on application of potassium hydrate. Sitka.

23. *Lecanora elegans* (Link) Ach.; Tuck. Syn. i. 170. On rocks, Sitka and Yellowstone Park.

24. *Lecanora cerinella*, Nyl. Luxb. 370. On slender twigs of coniferous trees, Monterey, California.

25. *Lecanora laciniosa* (Duf.) Nyl. Theloschistes concolor, Tuck. Syn. i. 51 p. p. Thallus without reaction on application of potassium hydrate. On bark, Sitka.

26. *Lecanora polytropa* (Ehrh.) var. *illusoria*, Ach. L. varia, var. polytropa, Tuck. Syn. i. 192 p. p. On rocks, Yellowstone Park.

27. *Lecanora symmicta* (Ach.) Nyl.; Tuck. Syn. i. 192, p. p. Thallus red on application of calcium hypochlorite. On dead wood, Sitka.

28. *Lecanora hypoptoides*, Nyl. in Flora, 1887, 371. On dead wood, Yellowstone Park.

29. *Lecanora pallescens* (L.) Ach.; Tuck. Syn. i. 196. On bark, Sitka.

30. *Lecanora coarctata* (Sm.) Ach.; Tuck. Syn. ii. 15. On rocks, Yellowstone Park.

31. *Cœnogonium interpositum*, Nyl.; Tuck. Syn. i. 258. On twigs of coniferous trees, Monterey, Calif.

32. *Lecidea meiocarpa*, Nyl. in Flora, 1876, 577. On cones of Cypress, Monterey, Calif.

33. *Lecidea sanguineo-atra* (Ach.) Nyl.; Tuck. Syn. ii. 21, f. corticola. On twigs of coniferous trees, Monterey, Calif.

34. *Lecidea myriocarpa* (DC.) Nyl.; Tuck. Syn. ii. 97. On cones of Cypress, Monterey, Calif.

35. *Opegrapha atrorimalis*, Nyl. in Flora, 1867, 488. On cones and twigs of Cypress, Monterey, Calif.

NEW SPECIES OF PACIFIC COAST PLANTS.

By Thomas Howell.

Lepidium occidentale. Annual, erect, branching, 4 to 12 inches high, hirsutulose below and puberulent throughout; leaves 1 to 3 inches long, the lower bipinnatifid with obovate to oblanceolate segments, reduced above to linear bracts; petals white, conspicuous, obovate, obtuse, narrowed below to a very short claw, longer than the obovate sepals; stamens 4 about equalling the petals; pods orbicular, 1½ lines wide, on slender widely spreading pedicels; style very short; stigma capitate.

Collected in the Umpqua Valley near Roseburg, Oregon, May 2, 1887. Much like *L. Virginicum* but easily distinguished by the four stamens and the larger flowers.

Arabis secunda. Stems several, erect, simple above the apparently perennial, woody, branching base, 10 to 18 inches high, stellate pubescent; lower leaves lanceolate about an inch long, narrowed below to a winged petiole, entire, acute; cauline leaves linear, revolute, sessile, distinctly auricled, one-half to an inch long: raceme many-flowered, strictly secund, pedicels filiform, 2 to 3 lines long (all deflexed one way): style very short; pods 1 to 2 inches long, less than a line wide; seeds small, slightly winged.

Collected on Mount Adams, Washington, August, 1882. Somewhat like *A. Holbœllii* but distinguished by its very narrow pods in a secund raceme.

Cardamine quercetorum. Glabrous, stem 6 to 12 inches high from a branching tuberous root: radical leaf 3 to 5-foliolate, leaflets ovate to elliptical, coarsely dentate, 1 to 2 inches long, petiolate; cauline leaves 1 to 4, mostly 3 to 5-lobed or-parted, with oblong-lanceolate, acute, mostly entire, divisions: racemes densely many-flowered; corolla rose-purple, a half inch long: fruit not seen.

Collected in the Williamette Valley near Silverton, Oregon, growing under small oaks, etc.

LUPINUS LAXIFLORUS, Dougl., var. **montanus.** Leaflets silky on both sides, rather shorter than the type; calyx densely silky, narrowed downwards, prominently spurred.

Collected on Mount Hood. Perhaps this will be made a distinct species when some one who knows our Lupines works out a revision of the genus.

Mitella Hallii. Pubescent with long whitish hairs, scapes naked, 6 to 18 inches high: leaves all radical, oblong, cordate, obscurely 5 to 7-lobed, repandly toothed, 6 to 18 lines long on rather stout petioles: flowers numerous, on short erect pedicels, often 2 or 3 together, therefore somewhat paniculate; petals yellow, pinnate with 2 to 4 short

and rather distant pinnae; calyx saucer-shaped, its short rounded lobes greenish-yellow; stamens 5, alternate with the petals, filaments subulate, spreading; stigma slightly 2-lobed.

Along small streams and wet places, Cascade Mountains of Oregon and Washington. Collected by Elihu Hall in 1871, n. 164, and referred to *M. trifida*, Graham, from which it is very distinct: that is a more slender plant with taller scapes, and white flowers in a secund cernuous spike.

Saxifraga Oregana. Scapose stem stout, 2 to 4 feet high, from a short perennial caudex, sparingly pubescent with brownish hairs; leaves oblanceolate, 4 to 10 inches long, entire, acute, attenuate below to a margined petiole: inflorescence viscid-glandular, flowers in panicled cymes; calyx attached to the ovary only at the very base; petals white, obovate, obtuse, 2 lines long, longer than the triangular, acute or acuminate soon reflexed calyx-lobes; ovary pyramidal, styles short, stigmas capitate; carpels distinct, seeds flattish, slightly winged.

Not rare in the mountain marshes of Oregon and Washington. This is one of the five or six species that have been referred to *S. integrifolia* but differs from that species in being very much larger and having more acuminate and deeply divided follicles.

Ribes acerifolium. Stems ascending, 3 to 8 feet long, unarmed; leaves 2 to 3 inches in diameter, truncate or slightly cordate at base, deeply 3 to 5-lobed, the ovate lobes doubly incised, glabrous above, often resinuous dotted beneath, petioles as long or longer than the blade, rather abruptly dilated and ciliate at base: racemes pubescent; bracts linear lanceolate as long as the slender pedicels: petals red, narrowly spatulate, a line long; calyx limb rotate with broad-spatulate lobes, the tube small and saucer-shaped; anthers broader than long, filaments flat, a line or more long; style deeply cleft: fruit purple or black, sparingly glandular-bristly.

On Mounts Hood and Adams near the snow line; also at the mouth of the Columbia River. No doubt this has been collected several times and referred to *R. laxiflorum*, but that is a more northern species with the "bracts shorter than the glandular pedicels," and "orbicular calyx-lobes" and "red fruit."

Erigeron confinis. Stems simple, one to several from a woody perennial root, 4 to 8 inches high, very leafy: leaves narrowly spatulate-linear, an inch long or more: heads usually solitary at the end of the stem, but often several together; involucre hemispherical, its linear acuminate bracts in few ranks, nearly equal, 3 to 4 lines long; rays numerous, rather broad, 6 to 10 lines long, purplish; pappus a single series of barbellate-scabrous bristles; achenes sparingly pubescent.

On high rocky ridges of the Siskiyou Mountains, July, 1886.

Senecio subvestitus. Stem simple, 1 to 2 feet high from short spreading rootstocks, more or less arachnoid-tomentose: leaves deltoid-lanceolate or obscurely hastate, the lowest subcordate, all petiolate, 1 to nearly 4 inches long, not much reduced above, dentate: heads several in a cyme, a half inch high, radiate, many-flowered; involucre campanulate with or without setaceous bracts at base.

In wet meadows, top of the Siskiyou Mountains near Waldo, Oregon. Somewhat resembling *S. triangularis*, but stouter and more succulent, and with larger heads.

Phacelia verna. Annual, soft-pubescent and cinereous, 4 to 10 inches high, branching from the base and decumbent: leaves obovate to spatulate, entire or rarely some of the lower ones incisely toothed, abruptly contracted below to a winged petiole, or the upper ones sessile: corolla pale blue, but little exceeding the calyx, open-campanulate, cleft to the middle, its appendages broad and free from the filaments; calyx-lobes linear-lanceolate, 2 or 3 lines long, hirsute; stamens exserted, authers oval; style deeply 2-cleft, hispid-

ulous: capsule ovoid, acuminate, more than half the length of the calyx; seeds 8 to 12, oblong to obovate, favose-pitted.

On rocky ridges in the Umpqua Valley, Oregon. Related to *P. Menziesii*, but with much smaller flowers of a lighter shade of blue, and a very different habit.

CORRECTIONS IN NOMENCLATURE.—VI.

By Edward L. Greene.

Lepidium medium. *L. intermedium*, A. Gray, Pl. Wright. ii. 15 (1853), not of A. Richard, Tent. Fl. Abyssin. i 21 (1847).

Potentilla nubigena. *P. decipiens*, Greene, Pitt. i. 106 (1887), not of Jordan, in Verlot, Cat. Jard. Grenoble, 28 (1856).

Potentilla stenoloba. *P. tenuiloba*, Greene, Pitt. i. 105 (1887), not of Jordan, Pugill. Pl. Nov. 67 (1852).

MISCELLANEOUS NOTES AND NEWS.

The "List of Pteridophyta and Spermatophyta of Northeastern North America" was received at Berkeley, January 25, 1895. The "Signatures," or successively printed parts, bear various dates from December 4, 1893 to December 16, 1894, and were said to have been distributed to a certain number of people; but neither the "List" nor any part of it was, so far as we can discover, offered to the botanical public until the middle of September, 1894. But that aside, it is desirable to know if the public might have obtained the "Signatures" as printed. If not, it is questionable whether limited actual distribution by "Signatures" will constitute publication.—W. L. J.

Mr. T. H. Kearney, Jr., recently Curator of the Columbia College Herbarium, has been appointed an Assistant in the Division of Botany, U. S. Department of Agriculture.

PRINCIPAL BOTANICAL WRITINGS OF PROFESSOR GREENE.

NEW SPECIES OF PLANTS FROM NEW MEXICO. Four papers in *Botanical Gazette*, Vol. vi., 1881.

NEW PLANTS of CALIFORNIA, ARIZONA AND MEXICO. Nine papers in *Bulletin of the Torrey Botanical Club*, Vols. ix. and x., 1882-83.

STUDIES IN THE BOTANY OF CALIFORNIA AND PARTS ADJACENT. Six papers in *Bulletin of the California Academy of Sciences*, Vols. i. and ii., 1885-87.

BIBLIOGRAPHICAL NOTES ON WELL KNOWN PLANTS. Ten papers in *Bulletin of the Torrey Botanical Club*, Vols. xiv.—xvii., 1887—90.

PITTONIA. A series of Eighty-Seven Papers, in Two Volumes, pp. 617, 1887-92. Published by the author. Price $2.50 per volume.

ILLUSTRATIONS OF WEST AMERICAN OAKS. One Volume, 4to, pp. 79, with Thirty-Seven Plates, 1889-90. Published under the patronage of James M. McDonald, of the Pacific Bank, San Francisco.

FLORA FRANCISCANA. An attempt to classify and describe the Vascular Plants of Middle California. Parts i., ii. and iii. (pp. 352, 1891-92) finished. Price $2.00.

MANUAL OF THE BOTANY OF THE REGION OF SAN FRANCISCO BAY. A Systematic Arrangement of the Higher Plants growing Spontaneously in the Counties of Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo and San Francisco, in the State of California. One Volume, 8vo., pp. xiii., 328, 1894. Price of library issue, $2.00; of school issue, single copy, $1.75.

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SOME SPECIES OF DODECATHEON.

By Edward L. Greene.

In 1888 I indicated that in this genus the roots, and some other subterranean parts, were found to furnish, in several instances, the most satisfactory characters upon which to establish species.[1] During the six years that have since elapsed, continued observation has brought to light a diversity of root characters quite beyond what one could have anticipated. While a very considerable portion of the species have a short subterranean erect crown bearing more or less diversified roots and sometimes bulblets, some are now known to me that exhibit quite other modifications of subterranean organs; and I shall here speak of several, under headings of such group characteristics as the underground parts afford.

* *Plants with a distinct perpendicular tap-root.*

D. radicatum. Main root at least 1 or 2 inches long, thickish, bearing coarse and simple fibrous roots on all sides; the short crown also with a special whorl of similar fleshy-fibrous roots: leaves very few (about 3 only), thin, light green, with elliptic-oblong entire blade tapering to a winged petiole almost as long: scape slender, few-flowered: corolla apparently pink or reddish: stamineal tube very short, anthers acute: style long exserted.

All that I have seen of Fendler's n. 549 of the New Mexican collection is of this species, and it is otherwise unknown to me. In all the specimens that I have been able to examine in American herbaria the remarkable tap-root—a thing so unexpected in the genus—has failed of being preserved. Some part of this organ remains in one of the specimens preserved at Kew; but it is best shown in the British Museum specimens. The whole plant is glabrous, the flowers

[1] Pittonia, i. 210.

probably pale. Its home will be found among the mountains back of Santa Fé, a region examined by Fendler a half-century ago, and totally neglected since his day.

* * *Plants, at least when mature, with a distinct horizontal or ascending, usually bulbilliferous rhizome.*

D. viviparum. *D. crenatum*, Greene, Pitt. ii. 74 (1890), not Raf. Atl. Journ. 180 (1833). The earlier *D. crenatum*, of which I was quite unaware at the time of making the homonym, is a large species of the prairies of Illinois and Indiana, which needs to be investigated anew, if perchance it is not yet extinct.

The type specimens of the present species were in a very mature state, and, about the flowers of this crenate-leaved plant I still know nothing. Its habitat on Mt. Tacoma is not in the wet meadows that lie concealed amid the deep forests of the lower parts of the mountain; though I dare not say that the wet meadow *Dodecatheon* may not be specifically identical with this which I found at the limit of trees. But my plant grew neither in very wet nor at all grassy ground. It was in the immediate shade of coniferous trees, and in a light soil of leaf mould. I now refer to it, with some hesitancy, specimens from several collectors which show neither the distinctly crenate leaves, nor the large bulblets of my specimens; even adding some in which the rhizome is not well developed; for as the plants are long-lived, and the rhizome is of slow growth, it is but reasonable to assume that plants of only two or three years, though robust, and flowering freely, will not show anything more than a short and rudimentary stage of the eventual quite distinct and elongated rootstock. And, as even the bulblets in the bulbilliferous species are not developed until the plant is past flowering, it were unreasonable to throw out of *D. viviparum* specimens wanting bulblets which have not passed beyond the flowering season. I now find one character which I did not at first detect in the original specimens, by means of which I think the species may be identified even when the

crenation of the leaf-margin fails; and that is, a certain very pronounced callous point which exists in every sinus of the crenate-leaved state, which callosity I find besetting, like a regular denticulation, the whole margin of the leaf in certain forms, which, at first glance appears to differ from those of *D. viviparum* in being entire. Rhizomatous plants with just this callous-denticulate (but not crenate) leaf margin I have from western Montana, collected by Professor Kelsey.

D. alpinum. *D. Meadia* var. *alpinum*, A. Gray, Bot. Calif. i. 467. Plant wholly glabrous, slender, from a few inches to a foot high: leaves not excessively numerous, usually spreading or depressed, small (mostly about 2 inches long), from oblanceolate to nearly linear, entire, acutish: flowers few, large, 4-merous, deep red-purple: stamens slightly if at all united at base; connective of anthers slender-subulate from a broad base, visibly co-extensive with the anther and plicate-rugulose: capsule valvate from the apex.

Common along boggy margins of subalpine lakes in the Sierra Nevada of California, more especially from Donner Lake southward. It is the *D. Jeffreyi* of Coville, Bot. Death Val. Exp. 147, but wholly distinct from that large species. Many specimens, doubtless young in years, show neither distinct rhizome nor bulblets.

* * * *Roots, leaves and scape form a short vertical crown.*

D. JEFFREYI, Moore, in Fl. des Serres, xvi. 99 (1867). *D. Meadia* var. *lancifolium*, A. Gray, Bot. Calif. i. 467 (1876). Plant with inconspicuous crown, and abundant fleshy-fibrous persistent roots: leaves oblanceolate, erect, 5 to 10 inches long, entire, acutish, mucronate: scape 1 to 1½ feet high; umbel many-flowered, the pedicels and calyx hirsute and glandular, even the outside of the corolla sparsely pubescent: segments of the corolla ample, deep red-purple: stamens distinct, dark purple, the connective slenderly subulate from an ovate base, reaching to near the tips of the

emarginate anthers, delicately rugulose: style very distinctly hispidulous almost throughout: capsule not exceeding the calyx, valvate from the very apex.

Common in the higher Sierra Nevada of California. The flowers appear to be constantly tetramerous; but there are no gradations whatsoever between this and *D. alpinum* of the same general range.

D. tetrandrum, Suksdorf in herb. Root characters and general aspect of the last, but leaves ampler, relatively broader; the whole plant glabrous, or else the calyx with a trace of the puberulent under a lens: corolla purplish, with a yellow ring near the base, the segments, and also the stamens usually 4 only (occasionally 5): connective slender-subulate from a short deltoid base, obscurely rugulose below: style glabrous: capsule surpassing the calyx, circumscissile very near the apex.

Mountains apparently throughout eastern Washington and Oregon; collected by Suksdorf, Cusick, and, on Drew's Creek in southeastern Oregon, by Mrs. R. M. Austin. Quite distinct from *D. Jeffreyi*, though it is the nearest ally of that species; but it belongs to another tract of country.

D. conjugens. Short crown with a dense fascicle of fleshy-fibrous roots that are deciduous from it after the flowering: whole plant glabrous: leaves obovoid and elliptic, 2 to 5 inches long including the distinct petiole, obtuse, entire: scape stoutish, 3 to 8 inches high: umbel few-flowered; flowers large, 5-merous, rarely 6-merous: corolla deep purple, varying to rose-red and to white: anthers distinct, obtuse, the connective lanceolate, acuminate to a linear point, delicately rugulose throughout all but the linear tip: fruit unknown.

Species remarkable as forming a link between *D. Hendersonii*, of which has the root and leaf characters, and that boreal and alpine group which have their anthers distinct. My first specimens were from Prof. Kelsey, who obtained them on dry hills near Helena, Montana. Better material is now in hand collected in southeastern Oregon, in 1893, by Mrs. R. M. Austin.

LICHENS OF THE VICINITY OF LOS ANGELES.—I.

By Dr. H. E. Hasse.

For the identification of these lichens, the writer is indebted to Mr. Marshall A. Howe of Berkeley and to the eminent lichenologist, Dr. Stizenberger, as also to Prof. A. J. McClatchie of Pasadena for advice. To these gentlemen I desire to express my thankful appreciation.

It is intended to supplement this list with additions from time to time and to include the lichen flora of Catalina Island. In connection I will report the finding of *Euphorbia misera*, Benth., upon the island during a recent visit. It grows among rocks, scarcely above high tide mark, between Avalon and Seal Park. It is not mentioned in the lists of Mr. Brandegee and of Mr. Lyon, and is an addition to the insular flora.

Ramalina ceruchis (Ach.), De Not. On shrubs along the beach at Santa Monica.

R. reticulata (Noehd.), Kremp.

R. Menziesii, Tuckerm. Common on trees and shrubs.

Cetraria Californica, Tuckerm. San Bernardino Range. Common.

Evernia vulpina (L.), Ach.

E. prunastri (L.), Ach. On bushes, San Bernardino Range.

Usnea barbata (L.), Fr., var. *hirta*, Fr. Sterile.

Theloschistes chrysophthalmus (L.), Norm. Common.

T. chrysopthalmus (L.), Norm., var. *flavicans*, Wallr.

T. lychneus, (Nyl.), forma *laciniosa*, Schær.

Parmelia tiliacea (Hoffm.), Floerk. San Bernardino Range.

P. physodes (L.), Ach., var. *enteromorpha*, Tuckerm. San Bernardino Range.

P. olivacea (L.), Ach.

P. olivacea (L.), Ach., var. *aspidota*, Ach.

P. conspersa (Ehrh.), Ach.

Physcia erinacea (Ach.), Tuckerm.
P. ciliaris (L.), DC.
P. pulverulenta (Schreb.), Nyl.
Physcia pulverulenta (Schreb.), Nyl., forma *muscigena* Auct.
P. stellaris (L.).
P. stellaris (L.), var. *aipolia*, Nyl.
P. crispa (Pers.), Nyl.
P. hispida (Schreb.), Tuckerm.
P. obscura (Ehrh.) Nyl.
P. adglutinata (Floerk.), Nyl.
Umbilicaria phœa, Tuckerm. Santa Monica Range.
U. Semitensis, Tuckerm. San Bernardino Range.
Peltigera canina (L.), Hoffm.
Endocarpiscum Guepini (Delis.), Nyl.
Pannaria microphylla (Sw.), Delis., forma *Californica*, Tuckerm.
Collema flaccidum, Ach.
C. nigrescens (Huds.), Ach. San Bernardino Range.
Leptogium myochroum (Ehrh.; Schær.), Tuckerm.
Placodium murorum (Hoffm.), DC., var. *miniatum*, Tuckerm.
P. bolacinum, Tuckerm.
P. cerinum (Hedw.), Naeg. & Hepp.
P. vitellinum (Ehrh.), Naeg. & Hepp.
P. luteo-minium, Tuckerm. On rocks, Santa Monica Range.
Lecanora muralis (Schreb.), Schær. Common.
L. muralis (Schreb.), Schær., var. *diffracta*, Fr. San Bernardino Range.
L. pallida (Schreb.), Schær.
L. pallida (Schreb.), Schær., var. *cancriformis*, Tuckerm.
L. subfusca (L.), Ach.
L. Hageni, Ach.
L. phœobola, Tuckerm. San Bernardino Range.
L. Pacifica, Tuckerm. Near the coast.
L. varia (Ehrh.), Nyl.

L. Brunonis, Tuckerm.
Lecanora pallescens (L.), Schær.
L. cinerea (L.), Sommerf.
L. cinerea (L.), Sommerf., var. *gibbosa*, Nyl.
L. chlorophana (Wahl.), Ach. San Bernardino Range.
L. xanthophana, Nyl. Santa Monica Range.
L. fuscata (Schrad.), Th. Fr. Santa Monica Range.
L. privigna (Ach.), Nyl.
L. privigna (Ach.), Nyl., var. *pruinosa*, Auctt.
Rinodina radiata, Tuckerm. Common.
R. thysanota, Tuckerm.
R. oreina (Ach.), Mass. Not frequent.

R. angelica, Stiz. Thallus similar to the last but differing in size of spores; these 16–20 by 8–10 mic., short ellipsoid, obtuse. Hymenial structures blue with iodine. Thallus yellow with potassium hydrate. March, 1893. On rocks, Santa Monica Range.

R. sophodes (Ach.), Nyl. Common.

Pertusaria lecanina, Tuckerm. Santa Monica; on various bushes, often in large patches.

P. pustulata (Ach.), Nyl. On trees; common.

Urceolaria scruposa (L.), Nyl. Rocks and earth; common.

Cladonia pyxidata (L.), Fr. Ground; common.

C. fimbriata (L.), Fr., var. *tubæformis*, Fr. San Bernardino and Santa Monica Ranges.

C. furcata (Huds.), Fr., var. *racemosa*, Fl. Rubio Cañon.

Lecidea Brandegei, Tuckerm. San Bernardino Range.

L. latypiza, Nyl.

L. enteroleuca, Fr., var. *achrista*, Sommerf.

L. albo-atra (Hoffm.), var. *ambigua*, Ach.

L. lapicida, Fr.

L. cumulata, Sommerf. Echo Mountain.

Buellia lepidastra, Tuckerm. Santa Monica Range.

B. oidalea, Tuckerm, var. *penichra*, Tuckerm. On *Sambucus*.

B. parasema (Ach.), Th. Fr.

B. parasema (Ach.), Th. Fr., var. *triphragmia*, Nyl. On *Rhus*.

B. myriocarpa (DC.), Mudd. Frequent.

B. bolacina, Tuckerm.

B. geographica (L.), Tuckerm, var. *lecanorina*, Floerk. San Antonio Cañon.

B. Bolanderi, Tuckerm. San Antonio Cañon.

Opegrapha atrorimalis, Nyl.

Arthonia anastomosans (Ach.), Nyl. On bark.

A. radiata, Pers. On *Juglans* and *Quercus*.

A. dispersa (Schrad.). On *Quercus*.

Acolium Bolanderi, Tuckerm. Frequent.

Verrucaria intercedens, var. *aethioboloides*, Nyl. On shales, Santa Monica Range.

V. viridula (Ach.), Schrad. On limestone, Santa Monica Range.

V. plumbaria, Stiz. Thallus smooth, whitish gray and darkening, spores colorless, bilocular, ellipsoid, each cell slightly constricted, 12–16 by 4–6 mic. Paraphyses distinct. Reaction with iodine; yellow to bronze with potassium hydrate. On various bushes, Santa Monica Range; frequent.

Verrucaria cerasi, Schrad. forma. On *Malvastrum Thurberi*.

V. fallax, Nyl. On bark.

NOVITATES OCCIDENTALES.—XI.

By Edward L. Greene.

Ranunculus Austinæ. Perennial by a fascicle of coarse and long fleshy-fibrous roots: stem and leaves glabrous, weak and rather succulent, the former 6 to 10 inches high; radical leaves few, of round-obovate outline, abruptly tapering to the very long and slender petiole or nearly truncate at base, and with mostly about five rather shallow terminal lobes, some with only three large and rather deeper lobes; cauline leaves cuneate-obovate, 3-lobed, sessile: flowers solitary, on very

long and slender peduncles, these few and terminal or subterminal: petals white: stamens yellow, rather few: carpels puberulent, rounded, neither compressed nor margined, tipped with a long and slender straight or nearly straight beak, and arranged in an ovoid or more elongated head.

Crevices of lava rock east of Willow Creek Valley in northern California, Mrs. R. M. Austin, 1894. Species evidently allied to *R. glaberrimus*, though very distinct by its slender habit, snow-white petals, and elongated head of achenes.

Ranunculus calthæflorus. Stem solitary, stoutish, erect, 6 to 15 inches high, dichotomous at about the middle, each fork ending in several subequal peduncles, and the whole inflorescence thus rather distinctly corymbose; herbage altogether glabrous except a few short hairs on the peduncles: radical leaves very few, ovate- and oblong-lanceolate, 1 to 3 inches long, on petioles as long or longer, entire or irregularly somewhat toothed, the cauline narrower and mostly sessile: petals about 10, narrowly obovate-oblong, or almost spatulate-oblong: achenes in a depressed-globose small head.

Plant of the Colorado Rocky Mountains chiefly, at elevations a little below the limit of trees; the *R. alismæfolius*, var. *montanus* of S. Watson partly; also type of the unpublished *R. alismæfolius*, of Geyer.

Ranunculus Hartwegi. *R. alismæfolius*, var. caule petiolisque basi hirsutis, Benth. Pl. Hartw. 295. *R. alismæfolius*, Gray, excl. var; also of Greene, Fl. Fr., not of Geyer.

Geyer's *R. alismæfolius*, never duly published, has been so variously misapplied in recent times that, as a name, it must be abandoned. Geyer's specimens, on the labels of which he wrote this as a new name, were of the Rocky Mountain species which I now name *R. calthæflorus*. Bentham, who was the first to print the name, gave no description at all of Geyer's plant, but entirely perverted Geyer's intended use of the name by applying it to that type which Torrey & Gray had called *R. Flammula*, namely, the

plant known now as the *R. obtusiusculus* of Rafinesque, for which S. Watson made the synonym of *S. ambigens*. To the Californian species, first collected by Hartweg, and which Bentham placed as an unnamed variety of the eastern *R. obtusiusculus*, Asa Gray was the first to transfer the Geyerian name of *alismæfolius*. I have hitherto followed Gray in this misapplication of Geyer's name. The only way out of this entanglement is that of rejecting altogether the specific name that has been so perverted. Indeed the only description extant, of the plant to which Geyer gave the name, is that now given above. His species was never published until now. This circumstance, taken in connection with the fact that the name which he gave in manuscript has long been applied to a distinct species, renders necessary the dismissal of the name.

R. Hartwegi of the Californian Sierra differs essentially from the Rocky Mountain *R. calthæflorus* in its more numerous and narrow entire leaves, its scattered flowers, and its broadly obovate petals only half as numerous, namely, five.

Asa Gray's statement that "*R. Bolanderi*, Greene, Bull. Calif. Acad. ii. 58, answers to the type of this species[1]" is not only without foundation; it proves that the author did not know that Geyer's type was not Californian.

Roripa tenerrima. Annual, weak and decumbent, very sparingly branching, 6 to 10 inches high, of delicate texture and glabrous: leaves few, lyrate-pinnatifid, the terminal lobe acutish: rachis of the few racemes almost capillary: pods rather distant, subconical, slightly curved, the tapering apex surmounted by a considerable beak-like style; valves and septum both very thin: seeds many, in 2 rows under each valve.

Collected sparingly, in Modoc Co., California, 1894, by Mrs. R. M. Austin.

Tissa sparsiflora. Diffuse, slender, glandular-hirsutulous throughout; lower internodes longer, the upper rather

[1]Proc. Am. Acad. xxi, 368.

shorter than the narrowly linear acute leaves; stipules thin, very short, broadly ovate and acutish, varying to obtuse and truncate: flowers mostly solitary, one to each pair of leaves, on slender pedicels shorter than the leaves: petals small, lilac: capsule ovate, obtusish, exceeding the sepals: seeds minute, red-brown, broadly semi-obcordate, smooth, the very thick margin as broad as the small body or nucleus.

Seven Mile Lake, Wyoming, 15 Oct., 1894, Prof. Aven Nelson. This is very interesting as being the first *Tissa* to appear from the interior of our continent, all the others being of maritime districts. The species is very well marked, but the specimens are defective in not showing the root; so that one cannot say whether the plant is annual or perennial. It is not small, the branches, though very slender, measuring nearly a foot in length, and seeming equally floriferous throughout, the pedicels not forming a distinct cyme even at the ends of the branches.

Trifolium Morleyanum. Stems slender but rather rigid, apparently quite erect, 6 inches high or more, from perennial horizontal rootstocks: herbage glabrous or nearly so: internodes short: petioles less than $\frac{1}{2}$ inch long: leaflets of lower leaves obcordate, only 2 or 3 lines long, of the upper, mostly linear or narrowly lanceolate, $\frac{1}{2}$ inch long or more, all rather strongly lacerate-serrulate, the teeth spinulose-tipped, the apex of all bearing a conspicuous subulate-aristiform cusp: peduncles mostly subterminal, more than twice the length of the leaves: heads hemispherical, $\frac{1}{2}$ inch broad; involucre deeply cleft into subulate-aristiform segments: calyx-tube campanulate, about 15-nerved, much shorter than the triangular-subulate aristate-pointed teeth, these with more or less reticulate venation near the base: pods well exserted from the calyx-tube but not equalling the teeth, 2- or 3-seeded.

A small but very distinct perennial species of the involucrate group, collected in fruit only, at Morley's Station, Modoc Co., Calif., 1894, by Baker & Nutting.

Raillardella paniculata. Stoutish, erect, perhaps 2 feet high, leafy throughout, paniculately branching; herbage viscid and rather densely short-hirsute with gland-tipped hairs: leaves an inch long, ovate and ovate-lanceolate, acutish, entire, closely sessile: heads 15 or 20, short pedunculed, ½–¾ inch high: bracts of the involucre few but somewhat biserial, linear-lanceolate, acuminate: rays none: achenes slender and nearly linear, acutely 5-costate, hispidulous; pappus of 50 or more stoutish barbellulate dull-white bristles.

Near the limit of trees on Mt. Shasta, 4 Aug., 1894, Willis L. Jepson. Evidently related to the little known *R. Muirii*, and perhaps along with that representing a genus distinct from *Raillardella*. Mr. Jepson's specimens are sadly fragmentary, so that nothing is known of the root, or even of the lower part of the stem.

Crepis Modocensis. Stout, erect, 8 to 16 inches high, canescently tomentulose throughout, and most so upon the involucres: leaves ample, mainly radical, laciniate-pinnatifid: heads nearly an inch high, 6 to 12, somewhat corymbosely arranged at the summit of the bracted and somewhat scape-like stem; peduncles and bracts of involucre beset with a few dark brown or blackish almost prickle-like bristles: achenes fusiform, slightly attenuate at apex, delicately and acutely costate: pappus firm, not very copious.

Lava beds of Modoc Co., Calif., Mrs. Austin, June, 1894.

Allocarya Nelsonii. Annual, diffuse, the stoutish and somewhat succulent branches strigose-pubescent, 6 inches long, rather densely racemose throughout and with a short bract subtending each pedicel: nutlets ¾ line long, ovate-lanceolate, carinate ventrally almost down to the nearly basal rounded or obscurely trigonous scar, the back with rather few and sharp transverse ridges beset with tufts of uncinate-tipped bristles, the intervals with low muriculate-roughened tuberculations.

Silver Creek, Wyoming, Prof. Aven Nelson, 26 Aug., 1894.

Ja MBG.

Collinsia concolor. Near *C. bicolor*, but with few pairs of leaves and long internodes, the plant a foot high or more, delicately puberulent throughout: leaves 1 to 1½ inches long, linear or oblong-linear, the margins crenate-serrate, or entire and revolute: racemes of few and rather remote verticils: calyx-tube hoary with a long villous-arachnoid pubescence; segments oblong, obtuse: corolla red-purple throughout, in form like that of *C. bicolor*, but less than half as large.

A very distinct new species, presumably from the southern part of San Diego Co., California, but sent without label or indication of special locality, by R. D. Anlerson.

Habenaria saccata. Two feet high or more, slender, rather conspicuously leafy up to the lax and not long, bracted raceme of green flowers: base of the stem with a single quite ample subscarious sheath: leaves lanceolate, acute, 3 or 4 inches long, spreading; bracts of the raceme linear-lanceolate, surpassing the flowers: lateral sepals oblong-lanceolate, the upper ovate-oblong and shorter: lateral petals falcate; lip linear, much longer than the short and thick sac-like spur: capsule sessile.

Lassen Creek, Modoc Co., Calif., Mrs. Austin, 1894.

A NEW CALOCHORTUS.

By J. G. Lemmon.

Calochortus collinus. Glaucous, 3 to 10 inches high, from a fibrous-coated bulb (no bulblets); simple or branching, lower leaf solitary, exceeding the flowers, 6 to 9 lines wide: flowers erect, 2 to 6, racemose, on long (3 to 6 inch) pedicels; sepals elliptical, three-fourths as long as the petals, abruptly acute or acuminate, greenish-yellow: petals creamy white, obovate, slightly concave, 6 to 9 lines long, naked above, a few white hairs near the glands, this small, cuneate, ciliate and purplish: stamens twice longer than the pistil;

Mo. Bot. Garden,
1896.

anthers oblong, obtuse, ¾ to 1 line long, yellowish: capsule nodding, oblong, 12 to 15 lines long, often with narrow, undulate wings: seeds angular, testa tuberculate.

Oakland hills, in shade. Near Berkeley, Mountain View Cemetery, Seminary Park, Laundry Farm, etc.

This has been referred to *C. lilacinus* of Kellogg, but it differs from that widely in characters of the bulb, absence of bulblets, color of petals, and scarcity of pubescence. Mr. Carl Purdy has called my attention to the fact that the two first sub-sections of § EUCALOCHORTUS including *C. albus*, *pulchellus*, *amœnus* and *Benthami*, *Maweanus*, *cœruleus*, *elegans*, *Tolmiei* and *apiculatus*, all grow in wood-lands in high, well drained situations; also that none of them are bulbiferous; while the species of the third sub-section—*C. nudus lilacinus* and *uniflorus*—grow in wet meadows or along streams, often where the bulbs are under water for many months of the year; also that these last-named species are notably prolific of bulblets.

The new species follows *apiculatus* in Watson's *Liliaceæ*[1] and *C. Maweanus* of Greene's revision of the genus.[2]

OPEN LETTERS.

Publication by signatures.

Referring to the question raised on page 36 of the February issue of ERYTHEA, relative to the publication of Memoirs Torrey Botanical Club, Vol. 5: containing the "List of Pteridophyta and Spermatophyta of Northeastern North America" by dated "signatures," I would state that these have been sent to everyone who has applied for them as printed, and that any one who cared to ask for them could have received them.

I believe that this is a perfectly well-understood method of publication, adopted by a large number of societies, and I

[1] Proc. Am. Acad. xiv., p. 263.

[2] Bay Region Botany, p. 312.

have not seen its validity questioned before. A considerable number of privately printed works have been issued in this manner, notably Mr. Bentham's "*Plantae Hartwegianae*" and Professor Greene's "*Pittonia.*" The method has very obvious advantages, for with dated signatures the troublesome questions arising from doubt as to a few days or weeks priority of names can in most instances be entirely avoided.

N. L. BRITTON,
Chairman Committee of Botanical Club, A. A. A. S. on publication of the List of Plants of Northeastern North America

COLUMBIA COLLEGE, 9 Feb., 1895.

In the absence of Mr. Jepson, whose question, propounded in our last issue, called forth the above, I may venture a comment or two on Dr. Britton's reply. The second paragraph of the reply has nought to do with the original question and even appears rather gratuitous; for Mr. Jepson could not need to be informed of the custom of publication by signatures, nor to be shown its advantages. We may assume that he was well aware that the *Plantæ Hartwegianæ*, *Pittonia*, and many other series of papers had been thus given to the public. He raised no question of the validity of such a method. The real question was, as to whether the particular "List" referred to could justly claim such publication.

In the instances cited by Dr. Britton, there had been subscription and exchange lists; and the signatures were sent out according to such lists. Was this true in the case now under consideration? Were the separate signatures of this fifth volume of *Memoirs of the Torrey Club* distributed to the subscribers, or were they sent only to members of the committee of publication? If this last be really the case, there will be room for a grave question as to the validity of the signature-dates as dates of publication for this important volume.

No author of a botanical document can successfully claim

priority for anything within it so long as the document is neither given nor offered to the public. The title page, or the signatures, may be dated, but the date or dates are false and must go for nought, so long as the pages remain with himself, and the public is not notified of their existence. And what is true in the case of an individual, is equally so in the case of a partnership of authors; such a partnership as this Committee of Publication represents. If the signatures in question were distributed to members of the Committee only, at the dates named, they were not published; and in this contingency the only date that can be claimed successfully for any new name in this *List*, will be that upon which the volume was first distributed to subscribers.

EDWARD L. GREENE.

MISCELLANEOUS NOTES AND NEWS.

BY permission of the Board of Regents of our University, Mr. Willis L. Jepson will spend the coming months of the spring and early summer in botanical study at the East. His address will be, Cornell University, Ithaca, New York.

SPECIAL attention may well be called to a very timely and well worded editorial in the February issue of the *Botanical Gazette*. It takes the form of an emphatic protest against the rising custom of urging forward to important critical work in botany, of young persons who have little botanical experience, and, as many a recent article in current journals will show, without the least approach to the due literary qualifications. This aspect of American botany is already becoming a scandal in the eyes of good botanists both at home and abroad.

PRINCIPAL BOTANICAL WRITINGS OF PROFESSOR GREENE.

NEW SPECIES OF PLANTS FROM NEW MEXICO. Four papers in *Botanical Gazette*, Vol. vi., 1881.

NEW PLANTS of CALIFORNIA, ARIZONA AND MEXICO. Nine papers in *Bulletin of the Torrey Botanical Club*, Vols. ix. and x., 1882-83.

STUDIES IN THE BOTANY OF CALIFORNIA AND PARTS ADJACENT. Six papers in *Bulletin of the California Academy of Sciences*, Vols. i. and ii., 1885-87.

BIBLIOGRAPHICAL NOTES ON WELL KNOWN PLANTS. Ten papers in *Bulletin of the Torrey Botanical Club*, Vols. xiv.—xvii., 1887—90.

PITTONIA. A series of Eighty-Seven Papers, in Two Volumes, pp. 617, 1887-92. Published by the author. Price $2.50 per volume.

ILLUSTRATIONS OF WEST AMERICAN OAKS. One Volume, 4to, pp. 79, with Thirty-Seven Plates, 1889-90. Published under the patronage of James M. McDonald, of the Pacific Bank, San Francisco.

FLORA FRANCISCANA. An attempt to classify and describe the Vascular Plants of Middle California. Parts i., ii. and iii. (pp. 352, 1891-92) finished. Price $2.00.

MANUAL OF THE BOTANY OF THE REGION OF SAN FRANCISCO BAY. A Systematic Arrangement of the Higher Plants growing Spontaneously in the Counties of Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo and San Francisco, in the State of California. One Volume, 8vo., pp. xiii., 328, 1894. Price of library issue, $2.00; of school issue, single copy, $1.75.

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ERYTHEA

A JOURNAL OF BOTANY, WEST AMERICAN AND GENERAL.

EDITED BY

WILLIS LINN JEPSON

AND OTHERS, OF THE DEPARTMENT OF BOTANY,

UNIVERSITY OF CALIFORNIA.

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PHYTOGRAPHIC NOTES AND AMENDMENTS.—I.

By Edward L. Greene.

Kumlienia Cooleyæ (Rose), Greene, Eryth. ii. 193. Very fine flowering specimens of this Alaskan rarity are now before me, and suggest some amendment of Mr. Rose's original account of the species.[1] There is nothing in his description of the sepals to indicate that these differ from those of ordinary *Ranunculus;* nor does the figure at all represent their real character. They are not, as supposed, green and concave and of oval outline. They are more elongated, quite as flat as those of a *Caltha*, and of a dull brownish-yellow; are distinctly narrowed at base, at least one of them approximating the unguiculate character that marks the petals; indeed, there is a not indistinct transition from sepals to petals. The petals instead of being smaller than the sepals are rather larger, the expanded flower measuring about an inch across. The claw of each petal is relatively larger and narrower than the figure indicates, and is almost tubular by involution of the two margins, somewhat after the manner of the lower part of the ligule of a composite. In characters of the flower, therefore, as well as in foliage and the whole general appearance of the young and vigorous plant, there is a close approach to the genus *Trollius;* and it in every way conforms, better than the original figure led me to think, to the type of *Kumlienia.*

My friend, Mr. M. W. Gorman, to whom I am indebted for the specimens now in hand, obtained them on July 4th, 1894, from the margin of an alpine lake, on the shore of Bailey Bay, Alaska. He says this "was the only plant except *Caltha biflora* that I found at this date. The winter ice on the lake was still about $2\frac{1}{2}$ feet thick, and the snow from 5 to 20 feet deep. I remarked that it resembled a small *Caltha palustris.*"

---

1 Contributions from the U. S. National Herbarium, i. 289, t. 22.

It will be seen by reference to Mr. Rose's paper, that the earlier collectors of the plant obtained it not by low lake-margins, but on bleak rocky summits. Still I can not doubt that Mr. Gorman's specimens represent the species collected by Mr. Funston and Miss Cooley.

Ranunculus Turneri, Greene, Pitt. ii. 296. *R. recurvatus*, Bong. Veg. Sitch. 123 in part: *R. occidentalis* var. *robustus*, A. Gray, Proc. Am. Acad. xxi, 373. While investigating, at Kew, the types of early Northwest American Ranunculi, I was much interested by the discovery that Bongard had referred two clearly distinct species to *R. recurvatus;* one of them a showy large-flowered plant, and quite the equivalent of my own rather newly published *R. Turneri.* My definition of the species is to be corrected as to the sepals, which, in the fully developed flower are truly reflexed; and it may be completed by the statement that the achenes are broad and flat, with a short recurved beak, and that they are rather numerous, forming a somewhat depressed-globose head.

The other species which the author aforesaid confused with *R. recurvatus* may well be called

Ranunculus Bongardi. *R. recurvatus*, Bong. Veg. Sitch mainly, not of Poiret. *R. occidentalis* var. *Lyallii*, A. Gray, l. c. Although somewhat like the preceding in foliage and pubescence, there is the widest discrepancy between them in the size of the flowers, and the characters of the fruit. The present plant is quite like true *R. recurvatus* in the minuteness of the petals; Sir William Hooker thought them abortive, with which opinion Bongard seems to have found it convenient to coincide; a view which has no solid foundation. The achenes are small, and are surmounted by a remarkably long circinate beak. The species is one of the commonest in Oregon, Washington, and southern Alaska, and runs into many varieties, or subspecies. One of the most pronounced of these is frequent southward even to the middle of the Californian Sierra. This may be called, var. **tenellus**=*R. tenellus*, Nutt. in T. & G. Fl.

That any of these forms are to be referred to *R. occidentalis*, Nutt., is a view which no man acquainted with the plants can entertain. He who asserts it should be ready to maintain that the eastern *R. recurvatus* may be relegated to *R. hispidus* as a variety; for that were quite as reasonable. Both *R. occidentalis* and *R. Bongardi* have their own extremes of variation, each within its own good specific limits.

Ranunculus Nelsonii, A. Gray, Proc. Am. Acad. viii, 374 in part. *R. recurvatus* var. *Nelsonii*, DC. Syst. i. 290. To this species Gray referred, twenty years ago, the plants which he long afterwards designated as a var. *robustus* of *R. occidentalis*, namely my *R. Turneri*. But it is evident that he never at any time took the pains of looking up, while in England, the type specimens of *R. Nelsonii;* probably contenting himself with an inference that Bongard's Alaskan plant, which he did see, must be the same. Nelson's specimens, which DeCandolle saw in the herbarium of Sir Joseph Banks, and which are the only type specimens of the species, are now in the herbarium of the British Museum, and they represent something so very different from my *R. Turneri* that I am unable to reduce my species to *R. Nelsonii*. This is a plant with stout somewhat fleshy stem, very hirsute; the leaves are ample and numerous, the peduncles, as DeCandolle described them, so short as not to surpass the leaves to which they are axillary, until after the flowering, when they are of course somewhat elongated. The flowers, though much smaller than in *R. Turneri*, do not at all approach those of *R. Bongardi*. The only other specimens which I can refer to *R. Nelsonii* have been collected in Alaska, some by Kellogg, others by Harrington. Some of these are in fruit, and exhibit a rather large achene, with triangular-subulate hooked beak.

Tellima racemosa. *Heuchera racemosa*, S. Wats. Proc. Am. Acad. xx. 365. This plant, as being a second species of

genuine *Tellima*, that is, a strict and close congener of *T. grandiflora*, becomes one of the more instructive and important of recently detected saxifrageous herbs; and it is certainly to be taken as a new argument for the restoration of *Lithophragma* to generic rank; for all these plants, now forming the vastly preponderant part of so-called *Tellima*, are utterly at variance with the type of that genus in habit, and in very constant characters of the corolla.

The species of *Tellima* here under special notice has not so much as one character of *Heuchera*. The following five points each and all declare it to be a *Tellima:* (1) racemose inflorescence: (2) valvate calyx-segments: (3) lacerate petals: (4) short and included stamens: (5) seeds not muricate. As to vegetative characters: the flowers are not borne on axillary naked peduncles, but on a terminal leafy stem. That the stamens are 5 rather than as in other *Heucheræ* 10, is at best a feeble argument to be brought forward against the five or six reasons, each one conclusive, for seeing it a *Tellima;* and to prove the worthlessness of this technicality of the mere number of stamens, one need only look into that genus which is the very next of kin, *i. e.*, *Mitella*, to find some species with 5, others with 10 stamens.

SUKSDORFIA VIOLACEA, A. Gray, Proc. Am. Acad. XV. 42 (1879). This elegant little herb of the far Northwest, supposed to have been first detected by Suksdorf in 1878, was really first obtained by David Douglas more than a half century earlier. Two small specimens of it are in the herbarium of the British Museum, mounted alongside a *Lithophragma* of Douglas' collecting, the whole bearing the legend, "Sandy soil, near Kettle Falls of the Columbia, 1826."

Among the Borragineous genera proposed by me as new, in the first volume of *Pittonia*, those concerning the validity of which I felt that no reasonable doubt could be entertained

were *Allocarya* and *Sonnea*. It is true that not only these but all the genera new and old which I then defended, are sustained by Baillon in his *Histoire* and also by Engler & Prantl; but until last year I felt more or less apprehension that *Allocarya* at least might be found to have some North European representatives; and that some such possible species might have been elevated to generic rank, under a name that might antedate the publication of the earliest pages of *Pittonia*. I had been not without apprehension that *Eritrichium obovatum*, A. DC., might prove to be an *Allocarya;* but on seeing good material of this at Kew, I discovered at once that it has no intimate connection with the Northwest American plants. It is a *Lappula*, rather. But the following are at complete agreement, both in habit and character with ALLOCARYA.

A. Australasica. *Eritrichium Australasicum*, A. DC. Prodr. x. 134. Native of Australia, and resembling *A. plebeia* of the Aleutian Islands; but the nutlets are more incurved than in any North American species. DeCandolle describes the corolla as yellow. In all the other known species they are white, but with a yellow band or circle surrounding the orifice of the short corolla-tube, and this is probably the real case here also.

A. albiflora. *Eritrichium albiflorum*, Griseb, in Gœtt. Abh. vi. 131. Species indigenous to the Straits of Magellan.

A. tenuifolia. *Krynitzkia tenuifolia* (Schlecht.), A. Gray, Proc. Am. Acad. xx. 267=*Eritrichium tenuifolium*, Schlecht. Mss. in Lechler's Plantæ Chilenses. Native of Chile.

FURTHER ADDITIONS TO THE FLORA OF SOUTHERN CALIFORNIA.

By S. B. Parish.

Within the last few years several lists have been published of additions to the Flora of the southern counties of the State, but our knowledge of it is yet far from being complete. Other plants, before undetected, continue to be discovered in our region, and in the present paper I wish to make a record of some of them.

When it is considered that, owing to the peculiar climatic conditions here existing, the Flora, far from being homogenous, presents a constant variation, so that in whatever geographical direction exploration is pursued, plants of one area are successively disappearing and those of another taking their places, and that while much of the ground has been quite thoroughly gone over, an inviting portion yet remains which has received only a cursory examination; it is reasonable to expect that very considerable further additions will be made to the number of plants now known. Those already reported number almost twenty-one hundred species and varieties of flowering plants. With a more complete knowledge of the entire district, it will probably be found that not less than twenty-five hundred seed-bearing plants grow within its limits.

Those named in the following list, not otherwise credited, were collected by the writer. Those designated by an * have not before been reported from this State. My thanks are due to the botanical authorities who have passed upon some difficult species, and to the correspondents who have favored me with valuable specimens.

Sagittaria arifolia, Nutt. J. G. Smith, Rep. Mo. Bot. Gard. vi. 6. Bluff Lake, alt. 7,400 ft., in the San Bernardino Mts. On the 20th of June, when these plants were observed, only phyllodia and a few immature leaves had been formed, so that the determination is mostly based on geographical

considerations. The phyllodia are very narrow and lax, and on emerging bend at right angles, the upper part floating on the surface of the water.

*ARISTIDA PURPUREA, Nutt., var. FENDLERIANA, Vasey, Contr. U. S. Nat. Herb. iii. 46. Rose Mine, alt. 6,000 ft., eastern slope of the San Bernardino Mts. Identified by Prof. W. T. Beal.

AGROSTIS VULGARIS, With. Naturalized about San Bernardino, in meadows and by roadsides.

AGROSTIS ÆQUIVALVIS, Trin. Bear Valley, alt. 6,500 ft., in the San Bernardino Mts.

POA UNILATERALIS, Scribner. Vasey, Grasses Pac. Slope, ii. t. 85. Bear Valley.

HEMICARPHA OCCIDENTALIS, Gray. On a wet sand bar, Bluff Lake.

SCIRPUS PAUCIFLORUS, Lightf. *Eleocharis pauciflora*, Link, Bear Valley. Identified by Dr. N. L. Britton.

CAREX ALMA, Bailey, Mem. Torr. Bot. Club, i. 50. Acton, Los Angeles Co., Dr. H. E. Hasse.

CAREX ILLOTA, Bailey, l. c., 15. Bluff Lake.

CAREX OCCIDENTALIS, Bailey, l. c., 14. Eastern end of the Santa Monica Range, Los Angeles Co. Hasse.

CAREX QUADRIFIDA, Bailey, var. LENIS, Bailey, Proc. Cal. Acad., 2d Ser. iii. 105. Bluff Lake.

CAREX STERILIS, Willd. Bluff Lake.

CAREX SUBFUSCA, W. Boott. Bear Valley.

CAREX VULGARIS, Fr., var. BRACTEOSA, Bailey, Proc. Am. Acad. xxii. 81. San Jacinto Mts. Hasse. The above carices have been identified by Prof. L. H. Bailey.

JUNCOIDES COMOSUM, Sheldon, var. MACRANTHERUM (Wats.) *Luzula comosa*, var. *macranthera*, Wats. Seeley's Flat, alt. 5,000 ft. San Bernardino Mts.

ALLIUM CAMPANULATUM, Wats. Proc. Am. Acad. xiv. 231. *A. uniflorum*, Parish, Bot. Gaz. xv. 52. Slover Mt., near Colton, San Bernardino Co. Identified by Mr. M. L. Fernald.

ALLIUM PENINSULARE, Lemmon in Pitt. i. 65. Hills south of the Santa Ana River, near San Bernardino, Reche Cañon, etc. Identified by Prof. E. L. Greene.

*POPULUS ANGUSTIFOLIA, James. Rattlesnake Cañon, and Grout Creek, at about 5,000 ft. alt., in the San Bernardino Mts. Infrequent. A small tree, not exceeding 20 ft. in height, growing by stream banks. The nearest previously recorded station is in eastern Arizona.[1]

SALIX LASIANDRA, Benth., var. FENDLERIANA, Bebb. Bear Valley. Identified by Mr. M. S. Bebb.

BETA VULGARIS, Linn. Well established in some of the streets of San Bernardino.

MONTIA FONTANA, Linn. Witch Creek, near Julian, San Diego Co. R. D. Alderson.

DELPHINIUM HESPERIUM, Gray, Bot. Gaz. xii. 51. Infrequent; near Gorman's Station, alt. 3,838 ft., at the upper end of Antelope Valley, Los Angeles Co.; Bear Valley.

*BRAYA OREGONENSIS, Gray, Proc. Am. Acad. xvii. 199. On a stony hillside on the eastern side of Bear Valley.

LUPINUS STIVERI, Kellogg. Hillside near Grass Valley, alt. 5,000 ft., San Bernardino Mts. Infrequent.

LUPINUS GRAYI, Wats. Frequent on hillsides at Bear Valley.

*TRIFOLIUM PROCUMBENS, Linn. Well established along the banks of a stream in Potato Cañon, alt. 3,000 ft., in the San Bernardino Mts.

*OXALIS WRIGHTII, Gray. Santa Monica, Hasse. Identified by Dr. Wm. Trelease.

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[1] We gravely doubt that this is *P. angustifolia*, James.—E. L. G.

EUPHORBIA PEPLUS, Linn. Occasional in gardens at San Bernardino.

VIOLA CANINA, Linn., var. ADUNCA, Gray. Frequent about the borders of meadows in the San Bernardino Mts. at 5,000 to 7,400 ft. alt. Talmadge's Meadow; Bear Valley; Bluff Lake.

*OPUNTIA MISSOURIENSIS, DC., var. TRICHOPHORA, Engelm. Pac. R. R. Surv. t. 15, ff. 1–4. Mojave Desert, A. H. Alverson. A remarkable and elegant form, the joints densely covered with white and flexuous spines 6 to 11 inches long, resembling horse-hair.

*GILIA BELLA, Gray, Proc. Am. Acad. xx. 301. Southwestern part of the Colorado Desert, San Diego Co. C. R. Orcutt.

*PHACELIA AFFINIS, Gray, Syn. Fl. II. i. 417. Collected in the same region as the above, and by the same collector.

*SOLANUM ELÆAGNIFOLIUM, Cav. Well established by roadsides at South Riverside. W. J. Lester.

*LIMOSELLA AQUATICA, Linn., var. TENUIFOLIA, Hoffm. On a wet sand bar at Bluff Lake. This little plant is recorded from a number of places along the northern Atlantic seaboard, but I find no notice of its having been found elsewhere in North America, so that its appearance here is quite remarkable. The specimens have been identified by Mr. Fernald.

*PENTSTEMON GLABER, Pursh., var. UTAHENSIS, Wats. Bot. King. 217. Abundant at Warren's Well, alt. 3,500 ft., at the eastern base of the San Bernardino Mts.

*PLANTAGO PATAGONICA, Jacq., var. ARISTATA, Gray. North of Santa Ana Cañon, near Mentone, San Bernardino Co. In some of the plants almost all the bracts were aristate, in others only a few of the lowest ones, forming a transition to the common var. *nuda*, Gray, of this region.

GALIUM TRIFIDUM, Linn., var. PUSILLUM, Gray. Frequent in meadows at Bluff Lake and Bear Valley.

*PTILORIA MYRIOCLADA, Greene, Pitt. ii. 130. Colorado Desert, near Whitewater, Riverside Co., alt. 1,500 ft. The root appears to be at most only biennial.[2]

CICHORIUM INTYBUS, Linn. Occasional in the streets of San Bernardino.

MATRICARIA OCCIDENTALIS, Greene, Bull. Cal. Acad. ii. 150. Roadside at Highland, San Bernardino Co. Apparently recently introduced. In flower (May 2) at the same time with the common *M. discoidea*.

HYMENOTHRIX WRIGHTII, Gray, Pl. Wright. ii. 97. Pine Valley, San Diego Co.; Alderson. The root is said by Mr. Alderson to be perennial,[3]

NOVITATES OCCIDENTALES.—XII.

By EDWARD L. GREENE.

Flœrkea versicolor. Firmly erect, not very slender, glabrous, 4 to 8 inches high, with a basal tuft of erect leaves only 2 inches long, and of about 3 pairs of leaflets, these mostly simple, narrowly oblong, acutish, a few 3-parted: stems with few leafy bracts, the flowers almost corymbose: sepals rather broadly and somewhat ovately lanceolate, slightly acuminate, 3 or 4 lines long; petals more than twice as long, cream-color, changing to lilac-purple at the tips.

Cedar Run, Shasta Co., Calif., 23 May, 1894, Baker & Nutting.

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[2] There must be an error on Mr. Parish's part as to the identity of this plant. *P. myrioclada* is even half-shrubby, and could never be mistaken for a biennial.—E. L. G.

[3] This was collected long ago, at Julian, San Diego Co. As I knew it in New Mexico it was always biennial; and so it is in the botanic garden at Berkeley.—E. L. G.

Calyptridium monospermum. Diminutive annual, or perhaps biennial, but with the rosulate-tufted radical leaves and umbellately congested terminal spikes of *C. umbellatum:* leaves small, obovate-spatulate, acutish: sepals round-reniform, the herbaceous middle portion sharply rugulose: petals 2, spatulate-oblong, obtuse: capsule nearly or quite orbicular, 1-seeded: seed round-reniform.

Big Cottonwood Meadows, Inyo Co., Calif., 5 Aug., 1891, F. W. Koch. This is the *Calyptridium* that is most extremely remote, in character, from what has been called *Spraguea;* yet Mr. Coville (Death Val. Exp. p. 282) has thought it to be "*Spraguea umbellata*," and so catalogued it. His presuming to reinstate *Spraguea* is therefore singularly infelicitous.

Rumex lacustris. Aquatic perennial, the solitary stoutish very erect stem 2 or 3 feet high, more than half submersed, this portion with only rootlets at the nodes, the internodes 4 to 6 inches long: emersed parts very minutely scabrous-puberulent, and the leaf-surface also papillose-muriculate: leaves 2 inches long, on petioles of an inch or more: blade oblong or lanceolate, abruptly acute, or the uppermost tapering: inflorescence short and dense: penicillately multifid stigmas large and conspicuous: valves of the small fruit all grain-bearing, the grain not broader than the venulose entire margins.

Silver Lake, Lassen Co., Calif., 30 July, 1894, Baker & Nutting.

Spiræa arbuscula. *S. betulæfolia*, var. *rosea*, A. Gray, Proc. Am. Acad. viii. 381. *S. lucida*, var. *rosea*, Greene, Pitt. ii. 221. Bushes erect, parting above into many short divergent rigid branches, each with a small dense cymose corymb at the end: stem and branches red, shedding annually a thin bark: growing branches and leaves slightly puberulent: leaves $\frac{1}{2}$–$\frac{3}{4}$ inch long, ovate or elliptical, subsessile, obtuse at both ends, usually sharply serrate except

toward the base: flowers rose-red: stamens long-exserted: calyx-lobes deltoid-ovate, erect in fruit: follicles glabrous and shining.

At subalpine elevations of the Sierra Nevada, Calif., and northward; often forming thickets or natural hedgerows two or three feet high.

Eryngium alismæfolium. Perennial, with a fascicle of very few coarse roots: radical leaves a foot long or more, jointed and rush-like, with no blade; the lowest cauline similar though with a small entire or spinose-toothed blade, and usually one or more spines at the joints of the long petiole: stem solitary, parted almost at base into 3 or more slender repeatedly dichotomous branches, but the whole not equalling the radical and lower cauline leaves: heads barely ½ inch high, short-peduncled or sessile: bracts not numerous, subulate-lanceolate, mostly spinose-toothed; bractlets oblong-ovate, the scarious margin with a few teeth or entire, apex spinose-cuspidate, little exceeding the flowers: calyx-lobes oblong-ovate, spinose-tipped, not equalling the styles.

Collected at Egg Lake, Modoc Co., Calif., 25 Aug., 1894, by Baker & Nutting.

Sanicula divaricata. Perennial root long and deep-seated, simple, slender and cylindrical: stem solitary, stoutish, erect, flexuous, a foot high or less: radical leaves few, biternately or triternately divided, the primary divisions petiolulate or subsessile, parted into obovate cleft or coarsely toothed segments; cauline leaves small and subsessile, each with a long spreading peduncle in its axil, this with an involucrate 3-to 5-rayed umbel: flowers greenish: fruits with long uncinate-tipped prickles from an abruptly pustulate-swollen base.

Collected by the author, near Castle Peak, above Donner Lake in the Californian Sierra, 20 July, 1893. Specimens of this excellent species may be found in herbaria under the wrong name of *S. Nevadensis;* the type of that being a very different stout, low, diffuse, acaulescent, plant.

Erigeron elegantulus. Near *E. ochroleucus*, but smaller, with broader and violet-colored rays: stems densely cespitose, the thickish and whitish branches thickly beset with narrowly linear strigose-pubescent leaves an inch long or more: scapiform peduncles slender, about 3 inches high, leafy-bracted toward the base: heads only 3 lines high; bracts of the involucre in 2 series, the outer two-thirds as long as the inner: rays 20 to 30: achenes with very prominent margin; pappus dull-white, simple, merely scabrous.

Dixey Valley, Lassen Co., Calif., 5 July, 1894. Baker & Nutting. A very pretty species, fully distinct from the more northerly *E. ochroleucus*, to which latter Dr. Gray probably too inconsiderately referred some plants that are far from yellowish in the coloring of their rays.

Erigeron barbellulatus. Near *E. Bloomeri*, but thrice as large and with conspicuous rays: caudex loosely branching and the branches several inches long, densely leafy at summit: leaves spatulate-oblanceolate, 1 or 2 inches long, 2 lines wide at the broad summit, green and only obscurely pubescent: scapiform peduncles 6 inches high, bractless except near the base, monocephalous: involucre nearly $\frac{1}{2}$ inch high; bracts equal: rays rather broad, only 12 to 18, purplish: pappus dull-white, coarse, firm and barbellulate-scabrous, the outer series represented by very few smooth setulæ.

Silver Lake, Lassen Co., Calif., July 20, 1894, Baker & Nutting.

Cladothamnus campanulatus. *C. pyrolæflorus*, Howell, Cat. Oreg. 15, and partly of A. Gray, Syn. Fl. 44, not of Bongard. Shrub 3 to 5 feet high, with few and stoutish ascending branches: leaves lanceolate, 1 to 3 inches long, tapering to a short petiole which, together with the veins beneath, is more or less strigose-hirsute with red hairs: flowers solitary or in pairs or threes, from lateral buds, on pedicels $\frac{1}{2}$ inch long, these setose-hispid with red hairs: sepals ovate-oblong, densely ciliate with short gland-tipped

hairs: corolla light salmon-color, campanulate, the petals joined at base into a short tube: anthers opening only by a pair of large round terminal pores.

High mountains of Washington and British Columbia; hitherto confused with the typical species, but so distinct as to be worthy of subgeneric rank; the corolla being sympetalous, and the dehiscence of the anthers very different from that shown in *C. pyrolæflorus;* for in this last these open laterally for about half their length, the terminal opening being narrow and elongated. The corollas also in this are choripetalous and expand to the rotate; and the flowers are borne terminally, on branches of the season. Good specimens of the original species, sent me from Alaska by Mr. M. W. Gorman, enable me to compare and define the new one.

Phacelia thermalis. Near *P. ciliata*, but low, branched from the base, the decumbent branches only a span long: the slightly clammy herbage roughish with a rather dense strigose pubescence and some short bristly hairs: leaves somewhat lyrately pinnatifid, the lobes rather few, crenate: spikes 2 or 3 inches long, rather dense: corolla small, open-campanulate, scarcely exceeding the calyx, pale blue or white: stamens not exserted: fruiting calyx much enlarged, the sepals 4 or 5 lines long, oblong-lanceolate, subcoriaceous, venulose, hispid-ciliate: seeds favose.

Little Hot Spring Valley, Modoc Co., Calif.. 4 June, 1894, Baker & Nutting, Related to the middle Californian *P. ciliata* as *P. cærulea* to *P. crenulata.*

Cryptanthe crinita. Annual, rather slender, 8 to 12 inches high, somewhat fastigiately branched from the base: branches and linear leaves rather stiffly hirsute: spikes both elongated and very dense, the rachis slender: calyx about 4 lines long, densely white-hirsute, the indument almost concealing the narrowly linear sepals: nutlet solitary, ovoid, abruptly acuminate, 1½ lines long, the surface dull-brown, quite smooth, but not polished.

Cow Creek, Shasta Co., Calif., 25 May, 1894, M. S. Baker. A species as peculiar in aspect as in character, and not intimately related to any other at present known. That the nutlets should be smooth but without vitreous polished surface is quite unusual.

Mimulus subreniformis. Annual, erect, very slender, 2 to 6 inches high, with few leaves and flowers and long internodes; stem distinctly quadrangular, glabrous: leaves 2 to 5 lines broad and mostly broader than long, from reniform to reniform-deltoid, with remote teeth and intervening denticulations, glabrous and purplish beneath, above roughish with short white setulose hairs, the lowest pair on rather long setulose-hairy petioles, the uppermost subsessile: pedicels exceeding the leaves: corolla very small, little exceeding the calyx-teeth, apparently yellow without red dots: fruiting calyx roundish, with very prominent upper lip, the pedicel beneath abruptly incurved.

Burney Falls, Shasta Co., Calif., 30 May, 1894, Baker & Nutting. Diminutive species, allied to *M. glareosus*.

Fritillaria agrestis. Stoutish, 12 to 20 inches high, from a close ovoid cluster of thick and subcylindraceous bulb-scales: leaves 6 to 12, the lowest in a whorl of 3, the others scattered: perianths 3 to 6, nodding, exactly campanulate, the segments somewhat rhombic-lanceolate, 1 inch long or more, greenish-white, but with prominent green midvein, and many green lines almost parallel with it: stamens much shorter than the pistil; anthers oblong, nearly basifixed: styles united toward the base only.

Common in grain fields among the valleys of the Mt. Diablo Range, California; flowering in March. Plant very attractive on account of its fine raceme of large nodding light-green flowers; but the odor of these is indescribably bad. The species is most related to *F. pluriflora*, and like that, has sepals and petals quite destitute of tessellation. *F. liliacea*, another ally, has oblanceolate petals and sepals

formed into a perianth which is turbinate below the middle: its flowers are horizontal or nearly so, not nodding, and exhale a delicate agreeable odor, and its bulb bears a remarkable orchid-like fascicle of few very thick fleshy roots.

OPEN LETTERS.

Professor Greene's question concerning the publication of Vol. 5: *Memoirs of the Torrey Botanical Club* by signatures, may be answered as follows:

In addition to the signatures sent the Committee of the Botanical Club, A. A. A. S., sixteen other sets were sent to subscribers and a number to members of the Torrey Club. The work was announced to be in press for a year before the final issue of the completed volume, on the cover pages of Bulletin of the Torrey Club. Part 2 of the preceding volume of the *Memoirs* was also issued by signatures, and members and subscribers, not in arrears, were notified in 1893 that they could be had in that form.

N. L. BRITTON, *Editor*.
Torrey Botanical Club.

It is gratifying to have, at last, an assurance that the "Check List" signatures were distributed as printed, to so considerable number of the subscribers and others besides the editors; and we are glad to feel that the dates may not henceforth be called in question, as the real dates of publication. It is unfortunate, however, that at such important centers of botanical research as Kew, and South Kensington, nothing seemed to be known of the existence of these signatures as late as last November.—E. L. G.

PRINCIPAL BOTANICAL WRITINGS OF PROFESSOR GREENE.

NEW SPECIES OF PLANTS FROM NEW MEXICO. Four papers in *Botanical Gazette*, Vol. vi., 1881.

NEW PLANTS of CALIFORNIA, ARIZONA AND MEXICO. Nine papers in *Bulletin of the Torrey Botanical Club*, Vols. ix. and x., 1882-83.

STUDIES IN THE BOTANY OF CALIFORNIA AND PARTS ADJACENT. Six papers in *Bulletin of the California Academy of Sciences*, Vols. i. and ii., 1885-87.

BIBLIOGRAPHICAL NOTES ON WELL KNOWN PLANTS. Ten papers in *Bulletin of the Torrey Botanical Club*, Vols. xiv.—xvii., 1887—90.

PITTONIA. A series of Eighty-Seven Papers, in Two Volumes, pp. 617, 1887-92. Published by the author. Price $2.50 per volume.

ILLUSTRATIONS OF WEST AMERICAN OAKS. One Volume, 4to, pp. 79, with Thirty-Seven Plates, 1889-90. Published under the patronage of James M. McDonald, of the Pacific Bank, San Francisco.

FLORA FRANCISCANA. An attempt to classify and describe the Vascular Plants of Middle California. Parts i., ii. and iii. (pp. 352, 1891-92) finished. Price $2.00.

MANUAL OF THE BOTANY OF THE REGION OF SAN FRANCISCO BAY. A Systematic Arrangement of the Higher Plants growing Spontaneously in the Counties of Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo and San Francisco, in the State of California. One Volume, 8vo., pp. xiii., 328, 1894. Price of library issue, $2.00; of school issue, single copy, $1.75.

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NOVITATES OCCIDENTALES.—XIII.

By Edward L. Greene.

Ranunculus alceus. Less than a foot high, rather slender, freely branching, soft-hirsute and villous but not canescent: leaves only about 1 inch long, on slender petioles, of ovate general outline and in 3 divisions, the middle one stalked, all cuneiform and doubly cleft: flowers very small, the round-obovate petals 5 only, barely a line long: achenes rather numerous, obliquely obovoid, smooth, or with a faint venation, tipped with a stout recurved beak, and forming a globose head.

Collected at an altitude of about 4,000 feet, on Elk Mountain, Mendocino Co., Calif., July, 1892, by Mr. Jepson.

Braya pectinata. Stems about 3 inches high, leafy throughout and erect, from a ligneous and partly subterranean branching caudex, the whole from a central perpendicular root: whole plant pale and glaucescent, hispidulous with bristly hairs which are partly simple and erect, partly double and divergent: leaves ½ inch long, pinnatifid into about 7 narrowly linear segments: flowers in a short raceme: petals conspicuous, white, changing to rose-color: growing ovary linear-oblong, several-ovuled; style conspicuous: pod unknown.

Ewing Creek, Modoc Co., Calif., May, 1894, Mrs. R. M. Austin.

Erysimum Californicum. Biennial, stout and simple, or with few branches, 1 to 2½ ft. high: herbage scarcely canescent, but thinly covered with closely appressed divided hairs, the divisions of which are stout and subulate: leaves runcinate-toothed, or the upper cauline mostly entire: raceme rather dense: flowers large, yellow, fading to cream-color, very fragrant, sepals more than ½ inch long, the inner with saccate base, the outer longer, unguiculate: limb of corolla

1¼ inches long, only ¾ inch broad, not cruciform, the petals diverging in pairs: anthers slenderly sagittate, the 4 longer ones exserted: pods long, slender, almost spreading, the cross-section sharply rhombic.

A large plant of the hills of the Mt. Diablo Range, California, growing only on open grassy summits; the pale flowers large and delightfully fragrant. It can hardly be the *E. grandiflorum*, Nutt., which is to be sought at Monterey, but which is unknown to Californian botanists of recent times.

Ribes Wilsonianum. Rigid and low shrub, with smooth branchlets and 1 to 3 spines at each node: growing parts and leaves more or less villous with a short pubescence: leaves small, rounded, 5-lobed, the lobes and teeth acute: peduncles rather slender, mostly 3-flowered: bracts persistent, broadly ovate, acuminate-cuspidate, villous: ovary short-prickly, scarcely villous: calyx dark red, the cylindric or slightly funnelform tube 3 lines long; segments acute, about as long: petals scarcely a line long, thinnish, white with red veins, cuneate-quadrate, nearly truncate and scarcely erose at apex, and with narrow and abruptly inflexed margins: filaments scarcely equalling the petals; anthers connivent, with prominent cusp bent outwards.

This has been grown for two seasons in the Botanic Garden at Berkeley, the living shrub having been sent from the mountains of Kern Co., Calif., in 1893, by Norman C. Wilson. Herbarium specimens of the same, I had, in the *Flora Franciscana*, referred to *R. amictum;* but the living plant is of very different aspect, and the floral characters of the new species are excellent.

Mentzelia Nelsonii. Annual, 2 or 3 feet high, freely and widely branching, the stoutish branches with a sparingly hispidulous whitish bark: lower leaves unknown, those of the branches from distinctly hastate-ovate to almost deltoid-ovate, 1 or 2 inches long, coarsely toothed or not indistinctly lobed, both faces green and rather sparsely appressed-

hispidulous, the hairs of the upper surface stouter and more enlarged at base: flowers many, small, orange-colored, sessile or nearly so, in the forks and axils: ovary subcylindric, less than $\frac{1}{2}$ inch long at flowering time and after: calyx-lobes slenderly subulate at flowering, almost as long as the ovary: petals 5 only, about 4 lines long: stamens few; filaments nearly filiform: anthers suborbicular: capsule and seeds unknown.

Eastern Wyoming, in cañons leading to the Platte River, 13 July, 1894, Prof. A. Nelson. A very well marked species, apparently annual, and certainly allied to the Mexican *M. aspera*, but much larger and more diffusely branching, the leaves relatively broader.

Dodecatheon glastifolium. Crown depressed, small, bearing rather few and short roots: leaves few, mostly oblong-lanceolate, rarely broader, 3 inches long or more including the distinct and rather slender petiole, entire, obtusish, the whole herbage glabrous and glandless: scape solitary, a foot high; umbel of only from 1 to 5 long-pedicelled flowers: corolla lilac-purple with a broad yellow band below the segments: stamens 4, distinct; connective with broadly subulate plicate-rugose base and long filiform extension reaching to the summit of the anther: capsule large, nearly $\frac{3}{4}$ inch long, thin-walled, circumscissile; style stout, slender-conical below the middle.

Lava Beds of Modoc Co., Calif., Mrs. Austin, 1894.

Dodecatheon Hendersonii, var. **Hanseni.** Leaves of firmer texture than in the type, narrower and quite entire; the whole plant quite glabrous: united portion of the corolla much broader: androecium shorter and less tapering; elevated and rugulose part of the connective oblong-lanceolate, tapering at both ends; anthers with spreading or recurved tips.

Foothills of the Sierra Nevada, Amador Co., Calif., Geo. Hansen. The androecium in this plant is so very unlike

that of the true *D. Hendersonii* that one can hardly doubt its being of a distinct species; yet in general appearance it is quite like the type.

DODECATHEON PATULUM, var. **Bernalinum.** Rather smaller than the type, deeper green, the stem and pedicels purple-dotted: segments of the corolla mainly of a rose-purple, the basal and united portion of a dark purple, this encircled by a broad band of white or pale cream-color: androœcium more elongated than in the type and manifestly tapering, the anthers narrower and erect, never spreading away from the style.

Known only from the highest summit of Bernal Heights, San Francisco, where it is plentiful, flowering in March.

DODECATHEON PATULUM, var. **gracile.** More slender than the type, the leaves narrower: segments of the corolla white, linear, narrow, elegantly twisted.

Grown in the Botanic Garden at Berkeley; the roots having been brought by Mr. Davy, from the slopes of Loma Prieta in Santa Clara Co., Calif. An exceedingly beautiful variety—if a mere variety—of the species so common on the low plains of the interior of the country.

Solanum cupuliferum. Stems very numerous, slender, decumbent or almost prostrate, woody at base; branches and foliage green and papillose scabrous, the short simple incurved hairs strongly pustulate at base: leaves ovate and ovate-lanceolate 1 or 2 inches long, transversely rugose, the margin crisped: flowers in lateral and terminal umbel-like clusters, the slender pedicels 1 inch long or more: calyx campanulate, cleft to the middle; lobes quadrate or quadrate-obovate, cuspidate-pointed: corolla $\frac{3}{4}$ inch broad, exactly rotate; lobes nearly truncate, but with a prominent triangular acute cusp.

Hills of the Coast Range of California, from Marin and Napa Counties northward. Related to *S. umbelliferum*, but with different pubescence; the plant usually almost her-

baceous and depressed; the expanded corolla quite flat, that of *S. umbelliferum* being wavy by the elevation of the middle of each lobe and the depression of the corresponding parts opposite the sinuses.

Mimulus marmoratus. Annual, slender, decumbent, 4 to 8 inches high, sparsely and very delicately glandular-villous, not slimy; internodes numerous, 1 inch long or more, acutely angled: leaves red beneath, subreniform-ovate, $\frac{1}{2}$ to $\frac{3}{4}$ inch long, saliently toothed, short-petiolate, the floral subsessile: peduncles exceeding the leaves and as long as the internodes, slender: calyx only slightly bilabiate when young, in maturity round-ovoid in outline and with only the upper segment obvious, the tube 4 or 5 lines long, dark with a very abundant mottling or marbling of dark red, the sinuses strongly woolly ciliate: corolla nearly 1 inch long, with very slender tube and ample bilabiate limb, this with smallish lateral lobes, the middle one ample, hairy, with a large dark red spot, and many dots behind this.

On moist rocks at Knight's Ferry, Stanislaus Co., Calif., 9 April, 1895, Mr. Frank W. Bancroft.

Crepis Bakeri. Stoutish and low, seldom a foot high, neither woolly nor even cinereous, the pubescence rather scanty and mostly hirsutulous: leaves half as long as the stem, deeply pinnatifid into oblong and spatulate spreading lobes, or merely coarsely toothed, or in small plants quite entire: stem parted from the middle or below it, into 3 to 6 pedunculiform monocephalous branches: involucre $\frac{3}{4}$ inch high, with both long and short slenderly acuminate bracts: achenes acutely costate, tapering from the middle.

In pine woods, near Egg Lake, Modoc Co., Calif., 8 June, 1894, Milo S. Baker. A member of the group to which *C. occidentalis* belongs, but exhibiting none of the tomentose pubescence usual to this group; the involucre peculiar.

A NEW VIOLET.

By Francis E. Lloyd.

While exploring in the Cascade Mountains southeast of Mount Hood during the last summer, a small violet came to my notice, which, after comparison with closely allied forms, proves, I think, to be a distinct species. The smallness of the plant, with its delicate, semi-transparent white petals, at once attracted my attention, and decided in my own mind its relationships. I shall call it

Viola Macloskeyi. Rootstock slender, creeping, bearing three or four leaves, and at length a few runners: leaves reniform; sinus shallow; the lamina slightly decurrent down the slender petiole, the margin obscurely crenate-serrate: the whole plant glabrous: stipules ovate, acute: peduncles 1 to 3 inches long, bearing two minute, subulate bracts: petals white, very thin, translucent, the spur very short; the lateral petals bearded, the venation of the lower petal indistinct.

Mossy, springy places in the Cascades, Oregon, differing from *V. blanda* and *V. palustris* in the size and character of the spur, and by the entire absence of color from the petals, and their translucency.

The species is named in honor of Professor George Macloskey, of the College of New Jersey, Princeton.

CORRECTIONS IN NOMENCLATURE.—VII.

By Edward L. Greene.

The generic name *Greggia*, still retained for certain Southwest American Cruciferæ, is at least twice revertible, and may be replaced by the following:

PARRASIA.

The two known species will be

P. camporum. *Greggia camporum*, A. Gray, Pl. Wright. i. 9 (1852).

P. linearifolia. *Greggia linearifolia*, S. Wats. Proc. Am. Acad. xviii. 191 (1883).

There is also a southwestern genus of Cucurbitaceæ which now goes under a name similarly twice revertible. I shall call this

IBERVILLEA.

I know of no more than three species.

I. Lindheimeri. *Maximowiczia Lindheimeri*, Cogn. in DC. Monogr. Phaner. iii. 726 (1881). *Sicydium Lindheimeri*, A. Gray, Pl. Lindh. 194 (1850).

I. tripartita. *Maximowiczia tripartita*, Cogn. l. c. 728.

I. Sonoræ. *Maximowiczia Sonoræ*, S. Wats. Proc. Am Acad. xxiv. 51 (1889).

It is very unfortunate for the botany of our era, that men can not be repressed from intermeddling in the nomenclature of plants, who lack a grammar school education.

It has come out within the last year, that American botany is falling very low indeed in point of literary quality. But I

have wondered that, even at the cultured East, no protest has been raised against certain supposed, but impossible, specific names (?) with which Mr. E. P. Sheldon has attempted to invest some Astragali.

This aspiring man has not only assumed that a mere beginner in systematic botany may unblushingly announce himself an authority upon so large and difficult a genus as *Astragalus;* he has shown such innocence of the principles of nomenclature as conceives that any pronounceable jumble of letters and syllables may pass for a specific name.

The first four which I shall here cite are each compounded of words taken from two languages. Syllables thus run together do not form words; hence they can not be names; and, although for convenience I must cite them as if they were synonyms, they are not such; for what was never a name can not become a synonym.

Astragalus thermalis. *A.* "*cuspidocarpus*," Sheld. Minn. Bot. Studies, i. 147.

Astragalus selenæus. *A.* "*crescenticarpus*," Sheld. l. c. 148.

Astragalus ammolotus. *A.* "*elatiocarpus*," Sheld. l. c. 20.

Astragalus leucocystis. *A.* "*lanocarpus*," Sheld. l. c. 144.

Astragalus miserandus. *A.* "*bajaensis*," Sheld. l. c. 169. This last piece of literary jugglery is highly curious. The Spanish adjective *baja*, meaning the lower of two things, or places, with the Latin ending *ensis* suffixed to it! It is no word, any more than *lowerensis* would be a word. Indeed the latter is a perfect equivalent for *bajaensis;* and if this can be a plant-name, so can that.

NEW NORTH AMERICAN UREDINEÆ.

By P. Dietel.

Æcidium Blasdaleanum, D. & H. Spots yellow, reddish or brown. Æcidia consociated in groups of very different size, hypophyllous and on the young fruits, causing swellings on the latter and on the principal veins of the leaves. Pseudoperidia short, with torn white edges, decaying. Peridial cells irregularly rounded, verrucose, easily separating. Æcidiospores elliptical, polygonal or globose, 18-21 x 17-19μ, verrucose, membrane colorless.

On *Cratægus rivularis* and *Amelanchier alnifolia.* Shasta Springs, Siskyou Co., Cal. Aug., 1894, leg. W. C. Blasdale.

This is a true Æcidium and does not belong to the genus Roestelia comprising the æcidial stages of Gymnosporangium. In the present specimens on *Cratægus rivularis* the leaves are attacked, on *Amelanchier alnifolia* principally the young fruits.

Æcidium Tonellæ, D. & H. Hypophyllous, pseudoperidia crowded, short, cup-shaped, edges recurved, white, minutely toothed. Spores roundish or oblong, finely verrucose, 17-20 x 17-18μ, membrane colorless. Spermogonia hypoyphyllous, scattered.

On *Collinsia tenella,* W. Klickitat Co., Wash., April 29, 1894, leg. W. N. Suksdorf.

From *Æcidium pentstemoniatum*, Schw.; this species differ by the distribution of the spermogonia and by not causing spots.

Uromyces Suksdorfii, D. & H. Sori amphigenous, scattered, minute, dark brown, pulverulent. Uredospores elliptical, densely verrucose, brown, 25-28 x 18-20μ. Teleutospores elliptical, obovate or spherical, golden-brown, coarsely verrucose, apex hooded, 25-32 x 23-25μ. Pedicels short, decaying.

On *Silene Oregana.* W. Klickitat Co., Wash., July 17, 1894, leg. W. N. Suksdorf.

Uromyces aterrimus, D. & H. Uredo: sori oval or circular, covered by the straw-colored epidermis; uredospores elliptical or ovoid, 25-34 x 20-28μ, pale yellowish, echinulate, with numerous germ-pores. Teleutospores: sori of indefinite outline, confluent, pitch-black, surrounding the uredosori, composed of numerous cases of brown paraphyses, that include the spores. Teleutospores elliptical, 28-40 x 20-30μ, smooth, little thickened or not at the apex, brown. Pedicels thin, somewhat shorter than the spores.

On *Allium unifolium.* Berkeley, Alameda Co., Cal., May 18, 1894, leg. W. C. Blasdale.

From *Uromyces ambiguus,* DC. and *Ur. bicolor,* E. Gallw., the two next allied species, this differs by the abundant formation of paraphyses and by having larger teleutospores than *Ur. ambiguus.* Although some isolated bicellular spores have been observed, it seems unreasonable to refer this species to the genus Puccinia on account of their rare occurrence.

Puccinia Dichelostemmæ, D. & H. Sori black, oblong, 2-3 mm., pulverulent, surrounded by the torn epidermis. Teleutospores broadly elliptical or nearly spherical, 53-68 x 48-55μ, central constriction wanting. Membrane uniformly thick ca. 5μ, smooth, dark brown, apacous. Pedicels short, mostly laterally attached.

On *Dichelostemma congestum.* Bingen, W. Klickitat Co., Wash., May 22, 1894, leg. W. N. Suksdorf.

Puccinia Parkeræ, D. & H. Sori hypophyllous on the convexity of impressed spots, firmly pulvinate, black, 1-2 mm. diam.. isolated or mostly arranged in close groups of 2-3 mm., on the pedicels elongated and causing distortions. Spores elongated or club-shaped, distinctly constricted at the septum, rounded or conical above, attenuated or rounded below, smooth, brown, considerably (ca. 5-8μ) thickened at the apex, 35-50 x 13-19μ. Pedicels firm, colorless, as long or somewhat longer than the spores.

On *Ribes lacustre.* Seattle, Wash., June, 1894, leg. Adella M. Parker and E. W. D. Holway.

Puccinia Wulfeniæ, D. & H. Sori amphigenous, principally epiphyllous, isolated or erumping in concentrical circular groups on somewhat thickened and blackish spots, pulverulent, cinnamon-colored. Teleutospores oblong, rounded at both ends and deeply constricted at the septum, light brown, smooth, with a hyaline papilla at the summit, 30-40 x 15-19μ, germinating immediately after they have ripened. Pedicels short and deciduous.

On *Wulfenia cordata.* Ukiah, Mendocino Co., May 22, 1894, leg. W. C. Blasdale.

Puccinia amphispilusa, D. & H. Sori amphigenous, of different size, from punctiform to 2 mm. diameter, scattered or forming an incomplete circle around a central sorus, pulverulent. Uredospores elliptical or subglobose, brownish, echinulate, 25-31 x 20-23μ. Teleutospores elliptical, rounded at both ends, moderately constricted at the septum, bearing a blunt, flat hyaline papilla at the apex and the upper end of the lower cell, smooth, brown, 30-40 x 17-25μ. Pedicels rather long, delicate and deciduous.

On *Polygonum* sp. Lassen Co., Cal., July 28, 1894, leg. F. P. Nutting.

This species has much resemblance with *Pucc. Bistortae* (Str.), but in the latter the teleutospores are smaller and never have a papilla. Apart from this, in *P. Bistortae*, the sori are formed exclusively on the lower side of the leaves. The same is the case in *Puccinia mammillata*, Schroet, and the papilla is here narrower and more abrupt.

Puccinia mirifica, D. & H. Sori predominantly epiphyllous, often covering the whole surface of the leaf, small, chestnut-brown, long covered by the inflated epidermis, afterward naked, pulverulent and confluent, containing uredo and teleutospores, both of exactly the same brown color and extraordinarily variable in form and size. Uredospores mostly ovoid, 24-40 x 18-34μ, echinulate with equatorial germ-pores. Teleutospores two-celled intermixed with single-celled ones, the two-celled measuring from 29 x 23 to

58 x 38μ, the single-celled from 23 x 25 to 45 x 33μ and even more. The two-celled spores are usually rounded at both ends and slightly constricted at the septum. Membrane verrucose, not thickened at the apex, pedicels short and deciduous.

On *Borrichia frutescens*. Corpus Christi, Texas, April, 1894, leg. A. A. Heller.

Puccinia graminella (Speg.), D. & H. Spots yellow or purplish. Æcidia and teleutospores epiphyllous. Æcidia arranged to oblong groups or lineally extending along the veins of the leaves. Pseudoperidia persistent, irregularly bursting, composed of oblong cells. Æcidiospores elliptical or ovoid, 21-29 x 18-21μ, epispore thick, colorless, verrucose or striolate. Teleutospores: sori elongated, pulvinate, dark brown; spores hardly constricted at the septum, thickened above, smooth, brown, 35-48 x 22-28μ. Pedicels stout, longer than the spores.

On *Stipa eminens*, at Berkeley, Alameda Co., Calif., May, 1894, leg. Holway and Blasdale.

This curious fungus bears only æcidia and teleutospores on the same host plant and both often from the same mycelium. The æcidial stage has been described by Spegazzini from Buenos Ayres under the name *Æcidium graminellum;* the teleutospore stage was hitherto unknown.

Puccinia Panici, D. Uredo: spots yellowish, indefinite; sori epiphyllous, very minute, oblong, surrounded by the burst epidermis, brown. Uredospores broadly elliptical or globose, densely echinulate, brown, 25-31 x 25-29μ. Teleutospores: sori epiphyllous, pulvinate, black, small, oblong or linear. Teleutospores oblong or clavate, apex thickened, rounded or conical, base rounded or attenuated, central constriction slight, 29-48 x 15-21μ, brown. Pedicels of different length, on an average as long as the spores.

On *Panicum virgatum.*

This is the well known, widely spread Puccinia on *Panicum virgatum*, which has been united hitherto with

Pucc. emaculata, Schw., on *Panicum capillare*. The resemblance of the teleutospores is indeed a nearly perfect one. But there are some other differences of great constancy, which render it necessary to separate them. The *Pucc. emaculata* is amphigenous in both its generations, whilst *Pucc. Panici* is always epiphyllous. Besides the uredospores of the latter species are greater and the spinosity of their membrane is more pronounced than in *Pucc. emaculata*.

Puccinia subnitens, D. Uredospores subglobose, brown, extremely finely verrucose, with numerous germ-pores, 23-24 x 20-22μ. Teleutospores: sori black, firm, pulvinate, mostly disposed in long rows and confluent; spores oblong or elliptical, rounded at both ends, slightly constricted, apex considerably thickened, often conical, 32-48 x 17-25μ, smooth, brown. Pedicels firm, colorless, longer than the spores.

On *Distichlys spicata*. Montana, leg. Anderson, comm. J. B. Ellis.

This species is very different in every respect from *Pucc. Distichlydis*, Ell. et Ev.

Puccinia adspersa, D. & H. Uredo: sori on the sheaths and on the leaves amphigenous, very inconspicuous, oblong, long covered by the epidermis. Spores globose or ovoid, 22-26 x 20-22μ, with colorless finely echinulate membranes and golden contents. Teleutospores: sori punctiform, scattered or associated on the sheaths in long rows, blackish, covered by the epidermis. Teleutospores very irregular, truncate at both ends or attenuated below, often angular, slightly thickened at the summit, constricted or not at the septum, 30-50 x 16-20μ, membrane clear-brown, contents retaining long a bright golden color. Pedicels short.

On an unknown grass. Modoc Co., Cal., July 30, 1894, leg. Frank P. Nutting.

Puccinia effusa, D. & H. Æcidia hypophyllous, less abundantly epiphyllous, covering widely spread patches on the stems, petioles and at the base of the leaves or forming

smaller irregular groups, which often extend along the veins. Pseudoperidia short, on the petioles oblong, with white torn edges. Æcidiospores subglobose or elliptical, with colorless verrucose membranes, 19-30 x 15-20μ. Uredo and teleutospores: sori mostly hypophyllous and on the stems, of different size, scattered or confluent, when occurring on the stems and petioles, to large patches; dark brown, pulverulent. Uredospores shortly elliptical or globose, 25-28 x 22-27μ, brown, membrane thick, echinulate. Teleutospores mostly elliptical or obovate, generally rounded above, sometimes attenuated below, usually without apical thickening, verrucose, chestnut brown, 30-50 x 22 x 29μ. Pedicels colorless, short, deciduous.

On *Viola lobata.* Dunsmuir, Cal., May, 1894, leg. Holway; on *Viola ocellata,* Ukiah, Cal., May 22, 1894, leg. Holway and Blasdale.

In its general appearance the fungus is somewhat different on both the host plants, but in the microscopical characters of the spots the agreement is complete.

REVIEWS AND CRITICISMS.

A Handbook of Systematic Botany. By Dr. E. Warming, Professor of Botany in the University of Copenhagen. Translated and edited by M. C. Potter, M. A., F. L. S., Professor of Botany in the University of Durham, College of Science, Newcastle-upon-Tyne. 8 vo., pp. XII., 620. London: Swan Sonnenschein & Co.; New York: Macmillan & Co. 1895.

The new Warming-Potter text-book is one that cannot fail to be of much use and interest to the general student of botanical science. Taken all in all, the work probably gives one a better conception of our present knowledge of plant-relationships than any other now before the public. The

Thallophytes have been rearranged largely in accordance with the ideas of Dr. Knoblauch, who translated Dr. Warming's Handbook into the German. The classification of the Fungi is essentially that of Brefeld. The Bacteria have been revised by Dr. Migula, the Florideæ rearranged according to the system of the late lamented Fr. Schmitz and the Taphrinaceæ according to Sadebeck. Five primary Divisions of the Vegetable Kingdom are recognized—the Thallophyta, Bryophyta, Pteridophyta, Gymnospermæ, and Angiospermæ. Under the Thallophyta are three Sub-Divisions—the Myxomycetes, the Algæ, and the Fungi. It may be remarked that the Bacteria look a little queer in the Sub-Division "Algæ;" yet, inasmuch as it has been quite generally conceded that these organisms find their nearest affinities among the Schizophyceæ, this disposition of them may not meet with serious protest.

A student reared on the classical text-books of Sachs and DeBary and their off-shoots is likely to indulge in some reflections on the mutability of human opinion, when he notes with how little apology or explanation sexuality is denied to the Ascomycetes. The former "erroneous" doctrine is scarcely alluded to. One or two of the familiar archicarp figures are given, like that of Stahl's section of the Collema thallus, but the supposed evidences of fertilization are passed over without serious comment.

A valuable feature of the work is the chapter of sixteen pages given to the discussion of the "Transition from the Cryptogams to the Phanerogams,"—a matter that receives very inadequate treatment in most of the text-books now in use. It would seem, however, that the authors could have been more rigidly consistent in the subsequent pages by avoiding such terms as "male" and "female" in referring to staminate and pistillate flowers and plants.

The work begins with the Myxomycetes and ends with the Aggregatæ, 324 pages being devoted to the Phanerogamia. The plan of arrangement is explained in the preface as

follows: "Each form which, on comparative morphological considerations, is clearly less simple, or can be shown to have arisen by reduction or abortion of another type having the same fundamental structure, or in which a further differentiation and division of labor is found, will be regarded as younger, and as far as possible, and so far as other considerations will admit, will be reviewed later than the 'simpler,' more complete, or richer forms. For instance, to serve as an illustration: Epigyny and Perigyny are less simple than Hypogyny. * * * Forms with united leaves indicate younger types than those with free leaves; hence the *Sympetalæ* come after the *Choripetalæ*, the *Sileneæ* after the *Alsineæ*, the *Malvaceæ* after the *Sterculiaceæ* and *Tiliaceæ*, etc. * * * Of course, these principles of systematic arrangement could only be applied very generally; for teaching purposes they have often required modification."

The mechanical execution of the work is excellent and typographic errors are few.—M. A. H.

RULES FOR CITATION

Adopted by the Madison Botanical Congress and Section G, A. A. A. S.

Writers and publishers of botanical matter are earnestly requested to adopt the forms here recommended. Examples of various citations illustrating the application of the rules in specific cases are given. Correspondence may be addressed to Secretary of the Committee on Bibliography, 1284 Massachusetts Ave., Cambridge, Mass.

In each complete citation there should be given the following items:

a. Author's surname in full, followed by a comma.

b. Exact title, verbatim, following the capitalization required by the usage of the language in which the title is written, but not necessarily the capitalization employed.

c. Name of periodical or work, abbreviated in accordance with list of journals and catalogue of authors under recommendation 1. *a. b.**

d. Series, if any, in Roman capitals.

e. Volume number in bold face Arabic numerals, followed by colon. In case there is no volume number, the number of the part, heft, lieferung, or fascicle is to occupy this place but is to be printed in Arabic numerals of ordinary face. When a volume is composed of parts separately paged the number of the part shall be written as an index figure to the volume number. Volumes in parts with continuous paging require no designation of parts.

f. Page, in Arabic numerals of ordinary face. In case paging of the paper is in Roman numerals these should be used, preferably small caps. Re-paging in reprints and separates is to be indicated by enclosing the numerals in parentheses. In case the original paging is unknown an em dash should occupy its place, the reprint paging being given in accordance with the foregoing

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*See Proc. Mad. Bot. Cong. 45. Je 1894.

rule. No individual or unique paging is to be cited under any circumstances.

g. Figures, plates and exsiccatæ are to be printed in Italic Arabic numerals, the number designating the figure or plate to be preceded by the abbreviations *f.* and *pl.*, respectively, in Italics. *d.* following a page number may be used, when desired, to indicate description of a species.

h. Exact date must be given if possible, written in the mode and with the abbreviations for months used by Library Bureau.* The year at least must be given.

i. Punctuation. Except the comma following the author's name, and the colon following the volume number all the items are to be separated by periods. If another citation follows in the same line it is to be separated from the first by an en dash. Specific, generic and varietal names are to be written and punctuated in the method used in the "List of Pteridophyta and Spermatophyta" issued under the direction of the Botanical Club, A. A. A. S.

j. If it is considered desirable to give other data than series number (if any), volume number, page and date, these should be added in brackets after the date. But useless or unnecessary data should be avoided.

k. Citations of reviews, abstracts, and all such secondary references should be enclosed in parentheses.

Examples.

1. **Lagerheim, G. von.** Ueber das Vorkommen von Europæischen Uredineen auf der Hochebene von Quito. Bot. Centralb. **54**: 324–331. 1893.

2. **Trelease, W.** A revision of the American species of Epilobium occurring north of Mexico. Rept. Mo. Bot. Gard. **2**: 69–117. *pl. 1–48.* 22 Ap 1891.

3. **Sargent, C. S.,** Editor. Populus monticola. Gard. and For. **7**: 313. *f. 56.* 8 Ag 1894.

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*Those abbreviations are as follows: Ja, F, Mr, Ap, My, Je, Jl, Ag, S, O, N, D; i. e., the initial of the month followed by the first distinctive letter.

4. **Dietel, P.** Die Gattung Ravenelia. Hedw. **33**: 22–48. *pl. 1–5*. 30 Ja. 49–69. 15 Ap 1894.

The foregoing are correct forms for catalogue by author. The following illustrate cases arising under the rules indicated by the letter preceding.

5. Ell. and Everh. Pyren. 491. My 1892.

6. e. Proc. Phil. Acad. **1894**: 53–59. 1894.

The year number, 1894, is the volume number, and not necessarily the year of publication. E. g.,

7. e. Bessey, Am. Pomol. Soc. **1885**: 42. 1886.

8. e. **Mez, C.** Bromeliaceæ. III. Flora Brasiliensis 115: 425–634. *pl. 81–114*. 1F 1894.

Not Fasc. CXV, 425–634, t. 81–114.

9. e. **Saccardo, P. A.** Syll. Fung. 7^2: 481. N 1890.

10. e. j. Bull. Geol. and Nat. Hist. Surv. Minn. 9: 39–42. 2 Mr 1894.

Not 9^2; nor 9 part 2; nor 1894 [part 2].

11. e. j. Linn. Sp. Plant. 6^2: 125. 1852. [ed. Willd.]

12. e. j. **Gray, A.** Man. Bot. 225. 1890. [6th ed.]

13. f. **Peck, C. F.** Rep. N. Y. Mus. **47**: — (18). N 1894.

14. g. Ell. and Everh. N. A. F. *1642*. F 1889.

15. g. Rept. Mo. Bot. Gard. **2**: 98. *d. pl. 28*. 22 Ap 1891.

16. i. Beringer, Am. Jour. Pharm. **66**: 220 My 1894.—Talasne, Ann. Sci. Nat. Bot. III. **7**: 85. *d. pl. 2. f. 3*. 1847.

17. j. **Bailey**, The Japanese plums in North America. Bull. Cornell Exp. Sta. 62: 3–36. Ja 1894. [Illust.]

The figures are not numbered.

18. k. Ell. and Kell. Jour. Myc. **1**: 12. *d.* Ja 1885.—(Hedw. **24**: 45 *d.* Je 1885.) Peck, (Grev. **22**: 111. Je 1894.)

Comment of the Foregoing Rules.

We print the *Rules for* Citation by request, but are not pledged to hand *them over to* the readers of ERYTHEA as being in our opinion faultless. *It is* evident that clearness and brevity are prime qualities in *citation*; and in the examples given there is not a little that seems objectionable, and which, we hope none will feel called upon to copy.

We notice that in case of joint authors the "and" is given instead of the usual short &. Why should any one conform to this sort of *innovation* in citation? Again, "Proc. Phil. Acad." is bad for *the Proceedings of the Philadelphia Academy*, because the "Phil." ordinarily stands for Philosophy or Philosophical in bibl*iographical* citation. It is quite a new thing to force this "Phil." to *stand* for Philadelphia. "Philad." is by long custom established for Philadelphia; and the custom grew out of a necessity, such as any accomplished bibliographer would readily percieve. Again: "Man. Bot." for Gray's *Manual of Botany*, etc.; what need of that second term "Bot."? *Did* Asa Gray write any other *Manual* but the one of botany? *And the* simple "Man.", universally employed heretofore is a*bundantly* sufficient. It is to be hoped that people may still be *content to* use it, and ignore this new recommendation. The "*Ell.* and Kell." of these examples should certainly become Ellis & Kellerm.; for "Kell." by *long* usage is the abbreviation for the late Dr. Albert *Kellogg, and* "Ell." for Stephen Elliott. Finally, are not we free *people of America* before all others, just now in danger, as scientists—bo*tanists*—of *coming* to such slavery of rules, regulations, and codes, *as will* render us uncomfortable at home, as it is already making us ridiculous abroad?—E. L. G.

PRINCIPAL BOTANICAL WRITINGS OF PROFESSOR GREENE.

NEW SPECIES OF PLANTS FROM NEW MEXICO. Four papers in *Botanical Gazette*, Vol. vi., 1881.

NEW PLANTS of CALIFORNIA, ARIZONA AND MEXICO. Nine papers in *Bulletin of the Torrey Botanical Club*, Vols. ix. and x., 1882-83.

STUDIES IN THE BOTANY OF CALIFORNIA AND PARTS ADJACENT. Six papers in *Bulletin of the California Academy of Sciences*, Vols. i. and ii., 1885-87.

BIBLIOGRAPHICAL NOTES ON WELL KNOWN PLANTS. Ten papers in *Bulletin of the Torrey Botanical Club*, Vols. xiv.—xvii., 1887—90.

PITTONIA. A series of Eighty-Seven Papers, in Two Volumes, pp. 617, 1887-92. Published by the author. Price $2.50 per volume.

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WILLIS LINN JEPSON

AND OTHERS, OF THE DEPARTMENT OF BOTANY,

UNIVERSITY OF CALIFORNIA.

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OBSERVATIONS ON THE COMPOSITÆ.—IX.

By Edward L. Greene.

In continuing the expression of my views of the generic relations of our homochromous asteraceous plants, I would first invite attention to another species which is very much out of harmony with *Solidago*, in which genus Asa Gray always insisted upon placing it, notwithstanding that it has no ray-flowers at all, and that all its corollas are purple, or at least white changing to purple in age. I refer to the plant first described by Stephen Elliott as *Aster? discoideus*. Elliott was the original discoverer of it and no other author seems yet to have given it a full and satisfactory description, some of the more important points of which description were entirely ignored by Gray, in the *Synoptical Flora;* the color of the corollas being left wholly unmentioned by him, which is equivalent to saying that they are yellow, as in *Solidago* generally; though he admits that even the pappus is often tinged with purple. Elliott, while referring the plant doubtfully to *Aster*, says that he at first thought it to be of a new genus, but was afterwards "induced for the present to arrange it here" (in *Aster*); but it did not occur to him that it could possibly be placed under *Solidago;* neither did DeCandolle see it in any other light than that of something referable to no other established genus but *Aster*.

In mode of growth the species is doubtlessly solidaginoid, though no *Solidago* has precisely such foliage, or such inflorescence. It clearly is farther removed from *Solidago* than is the genus *Brachychæta;* and, by its short and clavellate pappus, and deeply cleft corollas, it is quite as distinct from *Aster*. I should therefore receive it readily in the rank of a genus, to be called

BRINTONIA.

B. discoidea. *Aster? discoideus*, Ell. Sk. ii. 358 (1824); DC. Prodr. v. 247 (1836). *Solidago discoidea*, Torr. & Gray, Fl. ii. 195 (1842).

The genus is dedicated to the late lamented Dr. J. Bernard Brinton of Philadelphia, a most intelligent student of *Solidago* and its allies.

By referring to pages 10 to 13 of this volume, it will be recalled that, in disposing of a certain natural group forming a part of Gray's "*Aplopappus*," a number of species of that author's "*Bigelovia*" were taken up, as of the same natural group, the *Ericameria* of Nuttall, and the whole subordinated to the still earlier genus CHRYSOMA. It now remains for us to consider other members of the inharmonious *Bigelovia* of the *Synoptical Flora*.

The exact type on which the elder DeCandolle established his genus of this name, is an herb of the Southeastern United States. It was first brought to the knowledge of botanists by Michaux, under the name of *Chrysocoma nudata*. More than thirty years later DeCandolle separated it from *Chrysocoma* and made it the type of his *Bigelovia;* and generic rank has since then always freely been conceded to it, with the exception that Dr. Otto Kuntze, in promulgating his extraordinary view of the limits of *Aster*, referred there this plant also. But the genus must needs be maintained; though none who have regard for the stability of generic names can reasonably continue *Bigelovia* as the name for it; for this *Bigelovia* was historically the sixth (!) real or supposed new genus to which the same name had been given. Rafinesque published a *Bigelovia* in 1819; Smith another, in the same year or earlier; Sprengel had a third in 1821, and DeCandolle himself attempted a fourth in 1824, a fifth in 1830, and ended with the sixth in 1836.

It is both unwise, and quite behind the time, to attempt the further employment of a name that has five chances of reverting to some other genus by right of priority; and Rafinesque's name, CHONDROPHORA, the earliest safe one, has already been brought forward in the recent volume (V) of the *Memoirs of the Torrey Botanical Club*.[1]

---

[1] Asa Gray as early as 1842 was convinced of the precarious tenure of the name *Bigelovia* for this type, and, in the Torr. & Gray Flora offered a provisional substitute, *Aciclinium* (op. cit. ii. 231, in foot note). Either he was unaware of, or chose to ignore, CHONDROPHORA, then already six years before the botanical public.

From genuine CHONDROPHORA most of those far-western shrubs that have been associated with it in the writings of Gray differ rather widely. It is an herb, and they are shrubs. It has a deeply lobed corolla, the lobes strongly recurved or reflexed; few or none of the western shrubs have that character. It has subulate included style-tips; they have linear more or less conspicuously exserted style-tips. Its achenes are glabrous or nearly so, and faintly 10-striate; theirs are much more elongated, more or less hairy, with a few angles and no striæ. These are the points of contrast between CHONDROPHORA, and those western shrubs not heretofore excluded by me from Gray's "*Bigelovia*." The single plant which is nearer than any other to true CHONDROPHORA, has been received by most authors as a species of *Solidago*, that is, *Petradoria pumila* (see p. 13 preceding). This has substantially the same characters of flower and fruit, the achenes being more distinctly 10-striate; but it is not an herb. Nevertheless the joining of this type to CHONDROPHORA would be doing less violence to real affinities than is done by Gray and others who have combined with it Nuttall's *Chrysothamnus*.

An affinity between CHONDROPHORA and *Euthamia* was more than once taken note of by Gray; but this relation is not so intimate; for the achenes in *Euthamia* are turbinate and silky.

The species of CHONDROPHORA, therefore, unless *Petradoria* be joined to it, seem to me to be two only.

1. C. NUDATA, Britton, Mem. Torr. Club, v. 317 (1894). *Chrysocoma nudata*, Michx. Fl. ii. 101 (1803). *Bigelovia nudata*, DC. Prodr. v. 329 (1836).

2. **C. virgata.** *Chrysocoma virgata*, Nutt. Gen. ii. 136 (1818). *Bigelovia nudata*, var. *virgata*, T. & G. Fl. ii. 232 (1842). *Chondrophora nudata*, var. *virgata*, Britton, l. c. The greater leafiness of this plant, its very narrow foliage, as well as its virgate inflorescence, convince me that its true rank is that of a species.

I have long thought that the establishment of the genus CHRYSOTHAMNUS was one of Nuttall's happiest propositions. He saw that these tufted shrubs of western alkaline plains were generically distinct from DeCandolle's *Bigelovia*. And Gray, his young colleague in the study of these plants, was of the same opinion. It was unfortunate that Gray, instead of following Nuttall as to the new genus, should have chosen to follow one far less deserving to be taken as an authority. Schelchtendal had, in 1839 or 1840, referred a Mexican species of what was of Nuttall's genus *Isocoma* to that Old World subgenus of *Aster* called *Linosyris;* and Gray, in the Torrey & Gray Flora proceeded, in the face of Nuttall's greatly superior knowledge of botany in general, and of these plants in particular, to dispose all the Chrysothamni under the Old World herbaceous genus *Linosyris*. This course, entered upon in much ignorance as to the real characteristics both of the foreign *Linosyris*, and of the to him almost equally foreign shrubs of western plains and mountains, he held to for more than thirty years. But in 1873, Bentham, when he came to take up the final examination of all known Asteroideæ, soon demonstrated the absence of near affinity between *Linosyris* proper and these shrubs of the Far West, and perceived the necessity of reinstating Nuttall's CHRYSOTHAMNUS. This was done in the *Genera Plantarum;* and I think we should have had little further trouble with the nomenclature of these plants had not Bentham merged in his *Chrysothamnus* the herbaceous genus *Bigelovia*, i. e., *Chondrophora*. At this juncture Gray asserted the priority of *Bigelovia* over *Chrysothamnus*, and so all the species became renamed under *Bigelovia*; Bentham himself accepting, in the *Addenda et Corrigenda* of his volume, the name *Bigelovia* instead of *Chrysothamnus*.

I have already expressed the opinion that *Chondrophora* and *Chrysothamnus* are not properly congeneric; that the plant which comes nearest to forming a connecting link between these two is *Petradoria*, a species which no one has yet referred to either genus. As compared with *Chondro-*

phora the typical Chrysothamni have corollas less deeply cleft and segments less recurved; style-tips more slender and exserted; achenes larger, narrower and more pubescent, with few angles, and a much less firm as well as often more copious and elongated pappus. They are all shrubs with a very hard wood; and their branches are leafy throughout, the leaves being all alike, *i. e.*, the lower not differing from the upper.

The following enumeration embraces the more typical species, and also a few that are anomalous.

1. C. PUMILUS, Nutt. Trans. Am. Phil. Soc. vii. 323 (1840). *Bigelovia Douglasii*, var. *pumila*, A. Gray, Syn. Fl. 140 (1884). Numerous erect branches 6 to 10 inches high, glabrous, very leafy, the bark whitish: leaves an inch long or more, glabrous, slightly glutinous, narrowly linear, very acute, 3-nerved, often involute or occasionally somewhat twisted; involucre 2 or 3 lines high, the bracts not very distinctly 4-ranked, the outer short, ovate-lanceolate, the inner oblong-linear, not acute, faintly carinate.

Nuttall's type specimen in the Herbarium of the British Museum, is a mere branchlet with leaves, and a terminal cluster of altogether undeveloped heads. The foliage therefore is all that is available for comparison; and the above description is drawn from specimens obtained by myself, in 1889, in the same district in which Nuttall collected his type, and which answer perfectly to that type in all points which it offers for comparison.

2. **C. puberulus.** *Linosyris viscidiflora*, var. *puberula*, D. C. Eaton, Bot. King Exp. 158 (1871). *Bigelovia Douglasii*, var. *puberula*, A. Gray, Proc. Am. Acad. viii. 646 (1873). Size and habit of the last, but all the parts from puberulent to almost or quite hispidulous. Plant often growing with the preceding, but not intergrading with it; hence doubtless a good species; and very common on desert plains of Utah, Nevada and northern Idaho.

3. **C. stenophyllus.** *Bigelovia Douglasii*, var. *stenophylla*, A. Gray, Proc. Am. Acad. l. c. and in part of Syn Fl. More slender than the two preceding, often taller, the stems with perfectly white bark; the narrowly linear acute 1-nerved leaves with more or less distinctly serrulate-scabrous margins, the whole plant otherwise glabrous: cymes rather loose and fastigate: involucre hardly more than 2 lines high the oblong obtuse but often mucronate or cuspid-pointed bracts rather distinctly 4-ranked: pappus very scabrous, almost barbellulate.

A very definite species peculiar to the eastern base of the Sierra Nevada. Almost throughout Western Nevada. In writing the *Synoptical Flora*, Dr. Gray wrongly referred here some plants of Utah and New Mexico which are very different.

4. **C. Greenei.** *Bigelovia Greenei*, Gray, Proc. Am. Acad. xi. 75 (1876); Syn. Fl. 138. Shrub with white bark, and ciliolate leaf margins, but lower than the last, the leaves larger and twisted: inflorescence more condensed and less obviously cymose: heads 3 or 4 lines high and somewhat clavate: bracts of the involucre oblong, abruptly subulate-tipped.

Species of high plains in Southern Colorado and adjacent New Mexico.

5. **C. ceruminosus.** *Linosyris ceruminosa*, Dur. & Hilg. Pac. R. Rep. v. 9, t. 6¼(1855). *Bigelovia ceruminosa*, A. Gray, Proc. Am. Acad. viii. 643. Often 2 feet high, with scattered spreading or recurved leaves and resinous stem; the inflorescence obviously cymose: involucre 5 lines high; bracts in distinct vertical ranks, narrow lanceolate, abruptly produced into a long slender spreading tip.

Apparently quite local, somewhere near Tejon Pass in southern California.

6. **C. elegans.** Size and habit of *C. pumilus*, but the very leafy branches of the season straw-colored and glabrous: leaves linear, not spreading, often almost erect,

strongly twisted throughout, manifestly 3-nerved (some seeming 5-nerved), nearly glabrous except the short-hispid-ciliolate or somewhat serrulate-scabrous margins: heads very numerous, in a compact terminal cymose corymb, the branches of which are angular and scabro-pubescent: involucre about $\frac{1}{4}$ inch high, the lanceolate acute carinate-conduplicate bracts rather distinctly 4-ranked: segments of the rather narrow corolla not widely spreading: style-tips rather short and linear-subulate: slender appressed-pubescent achenes nearly as long as the pappus.

Shrub common in western Colorado; the type specimens collected by myself in the Gunnison Valley, in 1890. It appears to form a part of Gray's *Bigelovia Douglasii*, var. *tortifolia* in the *Synoptical Flora*, but is no part of the original of that variety as published in the American Academy paper; that type being of the Sierra Nevada of California.

7. C. VISCIDIFLORUS, Nutt. Trans. Am. Phil. Soc. vii. 324 (1840). *Crinitaria viscidiflora*, Hook. Fl. ii. 24 (1834). *Bigelovia? viscidiflora*, DC. Prodr. vii. 279 (1838): *B. Douglasii*, A. Gray, Proc. Am. Acad. viii. 645 (1873) in part. Shrub 2 to 4 feet high, the erect branches of the season a foot long or more, with straw-colored or almost whitish bark, and with an ample fastigiate terminal corymb of middle-sized heads: leaves 2 inches long, narrowly linear, very acute, rather firm, 3-nerved, their margins more or less distinctly serrulate-scabrous: heads about 3 or 4 lines high: involucral bracts linear oblong, abruptly acute, about 3 in each vertical rank.

The type of this species is of the Columbia River Plains in the far North West. The varieties or subspecies are numerous, and each has its own territory.

Var. **lanceolatus.** *Chrysothamnus lanceolatus*, Nutt. l. c. *Linosyris lanceolata*, Torr. & Gray, Fl. ii. 233. *Bigelovia Douglasii*, var. *lanceolata*, A. Gray. Shrub not half as large as the type; foliage thinner, this and the branches altogether scabro-puberulent.

Common on high plains of western Wyoming, and about the sources of the Platte, thence into Montana, where it seems to approach the type.

Var. **tortifolius.** *Bigelovia Douglasii*, var. *tortifolia*, A. Gray, Syn. Fl. 140. Leaves broader, narrowly lanceolate, very acute, twisted: cymes smaller, less congested; herbage glabrous or nearly so: bracts of the involucre apparently not at all in vertical ranks.

Of the eastern slope of the Sierra Nevada, in California. A better knowledge of this plant may establish it in the rank of a species.

Var. **latifolius.** *Linosyris viscidiflora*, var. *latifolia*, D. C. Eaton, Bot. King Exp. 157. *Bigelovia Douglasii*, var. *latifolia*, A. Gray. Also much smaller than the type, mostly minutely scabrous: leaves much broader, quite oblanceolate, acute, usually 5-nerved: involucral bracts almost cuspidately acute, in not at all distinct vertical ranks.

Mountains of Nevada, Utah and southern Idaho.

Var. **serrulatus.** *Linosyris viscidiflora*, var. *serrulata*, Torr. Stansb. Rep. 389. *Bigelovia Douglasii*, var. *serrulata*, A. Gray. A taller plant, with narrow serrulate-ciliolate leaves. Utah and adjacent Nevada.

8. **C. Vaseyi.** *Bigelovia Vaseyi*, A. Gray, Proc. Am. Acad. xii. 58 (1876). Low, only 6 to 10 inches high, the branches not white, leaves glabrous, narrowly spatulate-linear: inflorescence fastigiate-cymose: heads subclavate; bracts of involucre very obtuse: achenes glabrous, 10-striate.

Remarkable species of southwestern Colorado, and adjacent Utah. In character of achene quite approaching *Petradoria pumila.*

OREGONIAN FORMS OF UMBELLULARIA.

By F. W. Wright.

The lumbermen of the Oregon woods recognize two varieties of the tree known to botanists as *Umbellaria Californica;* one which they designate as White Myrtle, and a second which is sometimes called Yellow, sometimes Black Myrtle.

That known as White Myrtle is more abundant than the other. It attains a height of from forty to fifty feet; its trunk, a diameter of from two to four feet. Its foliage is of a dark green, but with much bloom on the lower face. The wood of this variety is hard and brittle, but, when a tree of it is felled and left lying on the ground it very quickly decays. The cross-section of its trunk shows much more distinctly the annual rings than does that of the other kind.

The variety variously known as Yellow or Black Myrtle is smaller than the other. Its foliage is of a yellowish green, and is less glaucous beneath. When a tree of this variety has reached an advanced age, so that the heart-wood has decayed and the trunk is become hollow, the remaining wood though sound becomes streaked with black or very dark red-brown; and in this mature condition it is highly prized for the manufacture of fancy articles, such as cups, vases, napkin-rings, etc. Such articles when polished are of a deep yellow streaked and spotted with black. Young trees of this variety do not soon decay when left lying where they fall. Their wood seems to contain more oil than that of the White, and it becomes eventually streaked with black; though not until long after it has been cut. The name of Black Myrtle seems to have been given this, on account of the darkly variegated wood. It is called Yellow Myrtle in allusion to the yellowish hue of its foliage.

I have not yet been able to compare the fruits of these varieties, popularly so-called, to ascertain the possible cuspological grounds for distinguishing two varieties of *Umbellularia.*

NOVITATES OCCIDENTALES.—XIV.

By Edward L. Greene.

Astragalus Elmeri. Annual, slender, the ascending or slightly decumbent branches a foot long or less: herbage very minutely and sparsely strigose-puberulent: leaves scattered; leaflets in 4 to 6 pairs, narrowly cuneate-oblong, only about $\frac{1}{4}$ inch long, emarginate: peduncles, including the slender spike-like raceme thrice exceeding the leaves: calyx very small, campanulate, black with a strigose pubescence, the teeth about equalling the tube: corolla nearly $\frac{1}{4}$ inch long, light violet; banner obcordate by a V-shaped notch; wings little shorter than the banner, their lower margins meeting underneath the keel, the upper ones widely sundered; keel very short, blunt, abruptly incurved: pod triangular-ovate, 2 lines long, deflexed, strigulose with white hairs, not wrinkled.

Apparently a local species in Ross Valley, Marin Co., California. Related to *A. nigrescens*, Nutt., but very distinct in characters of the corolla; the main petals being many times larger than in the better known species, and the oblique position of the wings being very characteristic. When in flower only, the plant might pass for *A. Breweri*. I dedicate the species to Mr. Elmer Drew, who was one of the first to collect it.

Psoralea monticola. Root perennial, enlarged, simple and fusiform, or parted into several coarse branches: stems numerous, a foot long more or less, rather slender, prostrate with 1 or 2 long internodes below, the upper ones short, subcinereous with a short sparse closely appressed pubescence, the petioles and peduncles with also a stiffly hirsute spreading or retrorse pubescence: peduncles slender, 2 inches long or more, subtended by a pair of lanceolate subulate tardily deciduous stipules; leaflets 5, about $\frac{1}{2}$ to $\frac{3}{4}$ inch long, cuneate obovate, rather obtuse, sparsely appressed-silky: peduncles longer than the oblong-ovoid raceme, the

latter nearly equalling the leaves: bracts lanceolate, 3 lines long: corolla about 6 lines long, the calyx-segments shorter, four of them resting against the banner, the fifth and separated one rather broader, linear-lanceolate: banner dull-white changing to the lurid-purple or deep-violet of the wings and keel.

Found only on the summit of Mt. Diablo, and unadvisedly referred to *P. Californica* in the *Bay Region Manual*.

Psoralea Douglasii. Habit and size of *P. macrostachya*, but more slender, nearly glabrous, the stem commonly rough with dot-like raised glands: leaflets rhombic-ovate, 1 to 2 inches long, obscurely or not at all mucronate, very conspicuously punctate: cylindrical racemes on long slender peduncles; bracts deltoid, caducous; rachis not hirsute: segments of the calyx not equalling the violet corollas.

This altogether distinct species has latterly been treated as a mere form of *P. macrostachya*, and it was figured by Lindley (Bot. Reg. xxi. t. 1769) as the supposed type of that species. Hooker, recognizing it as distinct, erred in another direction by referring it to his own *P. strobilina* (Bot. Beech. 332). It must needs be admitted as a very good species. True *P. macrostachya* is easily recognized by its abundant pubescence, narrower and strongly mucronate leaflets, very hirsute rachis, and by its calyx-segments quite exceeding the corolla.

Streptanthus versicolor. Erect, slender, a foot high or more, sparingly branching; lower part of stem, and also the middle cauline leaves hispid, the leaves more especially so beneath: lowest leaves unknown; cauline almost linear, sessile and auriculate-clasping, remotely serrate-toothed: slender raceme very lax, unilateral: sepals all ovate, subequal, carinate: petals at first white, changing to lilac-purple, very unequal, the upper pair with ample lamina and long-exserted claw, the lower pair not half as large, and their claws scarcely exserted: upper pair of filaments united

almost throughout, their small rudimentary anthers not divergent: pod narrowly linear, thin and flat, 2 inches long or more, arcuately recurved, glabrous.

On banks of the Navarro River, Mendocino Co., Calif., 1894, Miss Edith Byxbee. A delicate and beautiful species, with corolla more pronouncedly bilabiate than in any other member of what is now a rather large group with bilabiate flowers; a group which perhaps ought to be separated from *Streptanthus* altogether.

Erigeron Austinæ. Tufted and somewhat woody very leafy stems short and branching, each branch with a tuft of spatulate-linear erect hispid leaves, and a short scapiform leafless and monocephalous peduncle, this only about 3 or 4 inches high, and a third or one-half longer than the leaves: involucre hemispherical, ½ inch broad or more, the flowers 100 or more; bracts narrow, equal, hispidulous: rays none: achenes rather short, silky-pubescent; pappus slender, fragile, apparently simple, certainly without paleæ.

Collected on Davis Creek, Modoc Co., California, May, 1894, by Mrs. Austin. Species with the subligneous and cespitose mode of growth seen in *E. Bloomeri*, but in aspect and character near *E. poliospermus*, from which it differs in discoid heads, a merely pubescent (not white-villous) achene, and simple pappus.

Microseris intermedia. Slender and low, seldom more than 6 inches high: leaves all pinnately divided into linear segments: fruiting involucre broadly ovoid, scarcely 5 lines high: achenes short-cylindrical, barely a line long: palea of the pappus triangular-lanceolate, less than a line long, with thick brown mid-nerve, and white-scarious remotely serrate margins; the very slender brown awn about 2½ lines long.

This is a part of the *M. Bigelovii* of Gray's writings, and of my *Manual;* but I have long felt that it needed recognition as a distinct species. Its characters are constant; and the plant is not associated with *M. Bigelovii* in habitat. It belongs to clayey or gravelly slopes of hills; *M. Bigelovii* to low flats near salt marshes.

Hieracium amplum. Stoutish, 2 or 3 feet high, amply leafy up to the rather broad corymbose panicle, but no radical tuft of foliage: leaves oblong-spatulate, acutish, entire, 4 to 6 inches long, hirsute along the margins, and with scattered appressed hairs on both faces; upper cauline leaves and branches of the inflorescence pale and glaucescent, seemingly glabrous, but somewhat tomentose-puberulent under a lens: involucres about 5 lines high, loosely calyculate, the subequal bracts dark with black setulose stout hairs, otherwise glabrous: ligules yellow: achenes columnar, or even slightly widening to the summit; pappus white.

On Mt. Paddo, Washington, on hillsides at 6000 to 7000 ft. alt. W. N. Suksdorf, 27 Sept., 1893.

Bolelia cuspidata. Erect, slender, 6 inches high or more, with few and small leaves and few remote flowers: lower lip of corolla broadly trefoil-shaped, nearly 6 lines broad, only 4 lines deep, the broadly ovate lobes retuse, or evenly distinctly obcordate, abruptly and cuspidately pointed, the terminal half violet, the lower portion white, the white spot ending truncately or obcordately; the undivided part of the lip yellow, plane or nearly so, *i. e.*, without folds or protuberances or depressions; lobes of the upper lip 1½ lines long, spatulate-obovate, cuspidately acute, slightly divergent, straight, deep violet, with lines and reticulations of darker color.

In a low place in a grain field west of Yountville, Napa Co., Calif., 11 May, 1895: also in more slender form, with smaller and paler flowers, in Los Guilucos Valley, Sonoma Co., June, 1893, F. T. Bioletti.

Species most related to *B. bicornuta*, perhaps, but the configuration of the corolla far more simple. In coloring the corolla is almost like that of *B. pulchella*, but in form it is very different.

PHYTOGRAPHIC NOTES AND AMENDMENTS.—II.

By Edward L. Greene.

The genus Lithophragma (Nutt., in Torr. & Gray, Fl. i. 584) rests upon as good a combination of characters as any of the saxifrageous genera that are not monotypical. The herbarium botanist can not know how strong a character it has in its corolla, the two upper petals of which are smaller than the others, and usually entire, while the other three are variously cleft; though none are pinnatifid. In habit, the plants are all farther removed from *Tellima* than they are from typical *Saxifraga* itself.

The species not yet named under Lithophragma are the following:

L. scabrella. *Tellima scabrella*, Greene, Pitt. ii. 162: Fl. Fr. 193.

L. tripartita. *Tellima tripartita*, Greene, Eryth. i. 106 (1893).

L. Williamsii. *Heuchera Williamsii*, D. C. Eaton, Bot. Gaz. xv. 62 (1890). *Tellima nudicaulis*, Greene, Pitt, ii. 162 (1891).

The following appears to be quite new:

L. rupicola. Stems often 2 or 3 from the small grumous root, not very slender, a foot high or more, rather strongly hispidulous-scabrous throughout: lowest leaves from round-reniform to round-ovate in outline, deeply 3 to 5-lobed, the lobes again 3-lobed; petioles long, each with a large bulblet in its axil; cauline leaves of more angular outline, doubly cleft into narrow segments: raceme elongated, 12 to 20-flowered; fruiting pedicels nearly twice the length of the calyx: hemispherical base of the calyx adherent to the ovary, the body in maturity obviously 10-striate, the lobes short and obtuse: petals white, all deeply palmatifid, the 2

upper much smaller than the others: capsule 3-valved at apex and the valves well exserted: seeds striate lengthwise but neither muricate nor obviously granular.

Lava beds of Modoc County, Calif., June, 1894; growing in the shade of junipers. Collected by Mrs. R. M. Austin.

A recent study of the herbarium types in a certain group of Californian species of *Gilia*, supplementing some years of observation of them in the field, enables me to present the following, in place of what was given on page 147 of Gray's *Synoptical Flora*.

G. MILLEFOLIATA, Fisch. & Mey. Ind. Sem. Petr. 35 (1838). This is a slender often widely branching plant, with scattered small flowers, very common in western California, where it has of late years been known, according to the teaching of Asa Gray, as *G. multicaulis*, from which species it differs in its glandular-pilose pubescence, but more strikingly in the size, form and marking of its corolla. This organ is small, inconspicuous, and always 2-colored; the small acutish spreading lobes being white or bluish, the scarcely dilated throat being always marked with five large dark spots, one below each lobe. The plant is much more related to *G. tricolor* than to the next with which it has been confused. Its corollas are, like those of *G. tricolor*, never open except in the middle of the day, while in all the following they are open from very early morning until nightfall.

G. MULTICAULIS, Benth. Bot. Reg. under t. 1622: *G. achilleæfolia*, Benth. l. c., a larger form, well figured in Bot. Reg. t. 1682, not of A. Gray, Syn. Fl. 147, nor of Greene, Man. 248. Plant often 2 feet high, glabrous except the glandular-hirsute calyx: branches either many and with very few flowers at the ends, or few and with large densely cymose clusters: calyx mainly herbaceous, the scarious spaces below the sinuses extremely narrow; segments also wholly herbaceous, erect: corolla with short tube, and broad funnelform

throat, the latter about equalling the obovate acute segments, the whole dark violet, without markings: anthers also deep violet, on short filaments and wholly included within the limb of the corolla.

The type specimens in the Benthamian herbarium at Kew show that the original *G. multicaulis* and *achilleæfolia* of that author are not distinct. The latter name is more appropriate, as applying to the larger and more showy form figured so beautifully in the *Botanical Register;* and especially since this form is the common one in nature; the smaller, many-stemmed state being less frequent. The transference of the name *G. achilleæfolia* to a very different plant of the sea-board sand-hills, accomplished by Asa Gray, but attributed to Bentham, was without any warrant; for Bentham never knew that plant; at least, there is none of it in his herbarium; and apparently it has never been in cultivation in Europe.

G. abrotanifolia, Nutt. mss. in herb. Brit. Mus. Nearly glabrous, 1 to 2 feet high, simple, or with few ascending branches, these and the upper part of the main stem naked and pedunculiform, bearing a terminal dense cymose cluster of large blue flowers: leaves ample, even the cauline tripinnately dissected, the ultimate segments linear and spatulate-linear, spreading or curving backwards, very acute: calyx nearly or quite glabrous, mainly hyaline, only a broad mid-vein truly herbaceous, the segments acute, not connivent: corolla large, apparently blue without markings; throat ample-funnelform, lobes spreading, obovate, obtuse: stamens scarcely exserted.

In the Santa Inez Mountains, back of Santa Barbara, Calif., 21 May, 1891, G. W. Dunn. Collected in the same region many years earlier, by Nuttall, whose specimens, labelled as above indicated, are in the British Museum. Almost the same thing, but with rather smaller corollas, the stamens not at all exserted, is distributed by Mr. Parish, from the San Bernardino region, as "*G. achilleæfolia.*"

G. Chamissonis. *Polemonium capitatum*, Esch. Mem. Acad. Petrop. x. 282 (1826). *Gilia achilleæfolia*, A. Gray, in part, not Benth. A foot high, glandular-puberulent: leaves mostly bipinnately dissected into narrowly linear segments: branches few, naked and pedunculiform, bearing a dense capitate cluster of deep blue flowers: calyx glabrous or glandular-pilose, broad and urceolate, mainly hyaline, only the narrow midribs herbaceous, the hyaline teeth broad and triangular, closing the tube both before and after flowering, only the short setaceous tips recurved-spreading: corolla deep blue throughout; tube cylindric; throat very short and broad; segments oblong, obtuse, scarcely spreading, usually even connivent, the well exserted stamens protruding from the sinuses.

Abundant in the sand hills of San Francisco, and unmistakably the "*Polemonium capitatum*" of Eschscholtz, being the only *Gilia* of the shores as explored by him and Chamisso, and the only one anywhere which answers to the description as to the "urceolate whitish calyx, with broad acute teeth, and broad green nerve." Although annual, properly, the root is indeed almost fusiform, and occasionally a plant lives through the winter, to flower for a second season; hence the "perennial" as to the character of the root is excusable. The anthers are almost white, so that in the dry specimens they may have seem to have been "yellow."

G. staminea. Near the preceding but tall and slender, not rarely 3 feet high, not in the least puberulent or glandular, but glabrous except a villous-arachnoid pubescence which is sparse upon the stem, conspicuous on the petioles, and abundant on the calyx: flowers capitate-congested at the ends of the long naked branches: calyx teeth ovate, setaceously acuminate, the midvein of these and the whole body of the calyx (mainly hyaline) densely cobwebby-villous: corolla light blue, large as in the last; the long-exserted anthers nearly white.

Very common throughout the interior of California; strangely referred by Gray to *G. capitata*.

EXCERPTS.

YOUR strictures upon Mr. Sheldon's *Astragalus* names, in the last number of ERYTHEA, were just to the point; and more of that kind of criticism is greatly needed. Amongst our reformers of nomenclature there is a sad lack of scholarship, and ambitious youths are too eager to do great things in print.—*Recent Letter from an Eastern Botanist.*

BOTANICAL SCIENCE is, by many, considered as of so easy attainment, that it is not unusual to assign the name of Botanist, to any man whose memory enables him to repeat the nomenclature of perhaps a few hundred plants; howsoever uninformed he may be, of those principles which entitle him, to the real name and character. * * By this degrading idea, men of the first learning and talents in this branch of knowledge, have frequently been levelled with the most superficial enquirers, and the most ignorant pretenders. Hence also this Science, which even in a speculative view, holds no mean rank, and, considered practically, is closely connected with medicine, and with the arts and elegancies of life, has been held forth as a trifling and futile employment. In truth, he properly is entitled, in any degree, to the character of the Botanist, whose acquirements enable him to investigate, to describe, and systematically arrange, any plant which comes under his cognizance. But to these abilities, in order to complete the character, should be united, an acquaintance with the Philosophy of Vegetables, and with the History of the Science, in all its several relations, both literary and practical, from remote antiquity to his own time.—*Historical and Biographical Sketches of the Progress of Botany in England.* By RICHARD PULTENEY, M. D., F. R. S. London, 1790.

PRINCIPAL BOTANICAL WRITINGS OF PROFESSOR GREENE.

NEW SPECIES OF PLANTS FROM NEW MEXICO. Four papers in *Botanical Gazette*, Vol. vi., 1881.

NEW PLANTS of CALIFORNIA, ARIZONA AND MEXICO. Nine papers in *Bulletin of the Torrey Botanical Club*, Vols. ix. and x., 1882-83.

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BIBLIOGRAPHICAL NOTES ON WELL KNOWN PLANTS. Ten papers in *Bulletin of the Torrey Botanical Club*, Vols. xiv.—xvii., 1887—90.

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OBSERVATIONS ON THE COMPOSITÆ.—X.

By Edward L. Greene.

With species No. 8, on page *96 preceding* begins the succession of four shrubs, all differing, *each in* its own way, from the best type of Chrysothamnus. They are all, nevertheless, best retained here, at least until better known.

9. **C. pulchellus.** *Linosyris pulchella,* A. Gray, Pl. Wright. i. 96 (1852). *Bigelovia pulchella,* A. Gray, Proc. Am. Acad. viii. 643 (1873). Tall and freely branching, the bark quite white: leaves narrowly linear, obtuse, glabrous: heads $\frac{3}{4}$ inch long: large 5-angled achenes glabrous; pappus very firm, copious and accrescent.

Plant of most peculiar aspect, quite suggestive of the Eupatoriaceous genus *Carphochæte* which inhabits the same region. No other *Chrysothamnus* has such a pappus.

10. C. depressus, Nutt. Pl. Gamb. 171 (1848). *Linosyris depressa,* Torr. in Sitgr. Rep. 161. *Bigelovia depressa,* A. Gray, l. c. Of the same general *region* with the preceding, though of more northerly range, and allied to it.

11. **C. albidus.** *Bigelovia albida,* M. E. Jones, in Gray, Proc. Am. Acad. xvii. 209 (1882). A most anomalous species, not only by its white flowers. Its corolla is deeply cleft as in no other *Chrysothamnus.* The leaves are almost terete and not indistinctly punctate as well as very glutinous. The shrub were almost as well referred to the genus *Chrysoma;* but its involucre *is more* like that of certain *Chrysothamni,* namely those here *placed* toward the end of the series.

All the shrubs *that follow* are still more notably, are more concordantly, diverse *from* the typical Chrysothamnus. They are of coarser and more *broom*-like growth, with softer more pithy wood, and the stems are *usually* clothed at least when young, with a dense white tomentum. The twigs and

foliage, when bruised, exhale a disagreeable odor of which there is no trace in the typical group. The corollas are usually if not always nearly destitute of a proper limb, the throat being elongated and almost or quite claviform, with only short suberect teeth in place of the usual larger and more or less spreading segments, and the style-tips are as commonly, perhaps quite invariably, elongated and filiform like those of the genus *Macronema*, the one discoid species of which is often mistaken by the inexperienced for "*Bigelovia Bolanderi*" which differs from this group of *Chrysothamnus* by its involucre only.

I have long been in a state of hesitancy as to whether this group should not be received as generically distinct from true *Chrysothamnus*. And again, if these shrubs do not belong to this genus, there is room for dispute as to whether they should form a genus by themselves, or be referred to *Macronema*, or to the South American *Dolichogyne*, to which last they bear a striking general resemblance. But the types of *Dolichogyne* have peculiar style-tips, rather too unlike those of any of our plants; and the bristles of the pappus are perceptibly flattened. But for these two peculiarities of *Dolichogyne* I should relegate to it all the following:

12. **C. graveolens.** *Chrysocoma graveolens*, Nutt. Gen. ii. 136 (1818). *Linosyris graveolens*, T. & G. Fl. ii. 234 (1842). *Bigelovia graveolens*, var. *glabrata*, A. Gray, Proc. Am. Acad. viii. 645 (1873). *Chondrophora nauseosa glabrata*, Rydb. Mem. Torr. Club, v. 317 (1894). *Bigelovia dracunculoides*, DC. Prodr. v. 329 (1836). *Chrysothamnus dracunculoides*, Nutt. Trans. Am. Phil. Soc. 325 (1840). Stout, very leafy almost glabrous shrub usually 3 or 4 feet high, the numerous long branches ending in an ample rounded cymose corymb, the branches of which are more or less tomentulose; leaves ascending, narrowly linear, very acute, 2 or 3 inches long, obscurely 3-nerved, glabrous: involucral bracts about 4 in each vertical rank, acute, glabrous even to the margin: corolla with slender tube glabrous or with a few short hairs; the

nearly cylindric throat cleft a fourth to a third the way down; pubescence of the achenes abundant, long, appressed, not very fine : style-appendages at least twice the length of the stigmatic portion.

Abundant on alkaline plains east of the Rocky Mountains, from the upper Arkansas and Platte, ranging northeastward to Dakota, then westward along the line of the British boundary possibly as far as British Columbia. Apparently not in the Great Basin unless eastwardly about Salt Lake.

It was doubtless this species which Pursh mistook for the Asiatic *Chrysocoma dracunculoides* (now *Aster dracunculoides*) and which in consequence of this error became *Bigelovia dracunculoides*, DC., and *Chrysothamnus dracunculoides*, Nutt.

13. C. SPECIOSUS, Nutt. Trans. Am. Phil. Soc, vii. 323 (1840). *Chrysocoma nauseosa*, Pall. in Pursh Fl. ii. 517 (1814)?? Size of the preceding, but stems more slender, inflorescence more open : leaves very narrowly linear, and with the branchlets of the inflorescence minutely white-tomentose : involucral bracts firm, acutish, not ciliate, tomentose on the back, or the inner ones glabrous except near the tip, all in vertical ranks of 3 or 4: corolla with slender almost glabrous tube rather longer than the subcylindric throat, this cleft a third of the way down : pappus copious, fine, only delicately scabrous, fuscous at least in age.

A far-western species, the type being of the upper Missouri, but common in Idaho, eastern Oregon, northwestern California and adjacent Nevada. Easily distinguished from *C. graveolens* by its slender habit, and almost filiform white leaves.

Var. ALBICAULIS Nutt. l. c. *Linosyris albicaulis*, T. & G. Fl. ii. 234 (1842). *Bigelovia graveolens*, var. *albicaulis*, A. Gray, Proc. Am. Acad. l. c., not of Bot. Calif. Stem and Branches densely lanate-tomentose ; foliage as in the type : tube of corolla clothed with delicate long-villous or somewhat arachnoid hairs.

Evidently a rare plant of northern Idaho or some neighboring region, which as late as 1873, according to Gray, had been collected only by Nuttall and by Burke; in the *Botany of the California State Survey*, he wrongly referred here a certain shrub of the Sierra Nevada which had been collected by myself.

Var. **gnaphalodes.** *Bigelovia graveolens* var. *hololeuca.* A. Gray, l. c. (1873)? Very tall, often 5 feet high, the whole shrub, even to the involucre, white with woolly tomentum; bracts often 4 in each vertical rank, margins not ciliate: throat of corolla claviform, the teeth only a fourth its length: corolla-tube not hairy.

Common in the deserts of middle and southern Nevada, from Pyramid Lake, Mrs. Curran, to Esmerelda Co., Mr. Shockley. The type of Gray's var. *hololeuca* was from Owen's valley, within the borders of California; but to this was assigned a cobwebby hairy corolla tube, just the character of var. *albicaulis*, perhaps by mistake.

Var.(?) **latisquameus.** *Bigelovia graveolens*, var. *latisquamea*, A. Gray, l. c. Tall, white-tomentose as to stem and foliage, but involucre less so: leaves fewer and shorter than in other forms, the inflorescence fastigiate, more open: inner bracts broad, thin, very obtuse: throat of the corolla shorter and broader, the teeth very short: pappus permanently white.

Southern New Mexico, near the old copper mines, Bigelow, Henry, and the present writer. Probably a distinct species.

Var. (?) **Arizonicus.** Tall and very stout, rather sparingly leafy, very white and tomentose: leaves 1 or 2 inches long, narrowly linear: outer tracts of involucre tomentose, acute, the inner obtuse: very slender corolla tube with a few clavellate spreading hairs; throat campanulate-funnelform, hardly more than a fourth as long as the tube and cleft rather deeply.

Santa Rita Mountains, southern Arizona, Brandegee. Perhaps on the strong characters of the corolla alone this should be admitted to specific rank.

Var. (?) **Plattensis.** Low and merely suffrutescent; seldom a foot high, very leafy, the long narrowly linear white-tomentose leaves spreading or recurved: involucral bracts about 3 in each vertical rank, acute, glabrous except that the margins are rather densely woolly-ciliate: tube of corolla somewhat pubescent; throat elongated, rather deeply cleft.

Plentiful on alkaline plains of the Platte and elsewhere along the eastern base of the Rocky Mountains; associated with *C. graveolens*, but very distinct from that, flowering earlier; referable to *C. speciosus* unless a distinct species. This will probably be the *Chondrophora nauseosa* of Britton Mem. Torr. Club. v. 317.

14. **C. Californicus.** *Bigelovia graveolens*, var. *albicaulis* A. Gray, Bot. Calif. i. 317 (1876) as to the Californian plant, but not as to the description, nor of Proc. Am. Acad. (1873). Stout and rather low, seldom 2 feet high; flowering branches densely white-tomentose, the foliage also usually so; heads mostly in a somewhat ample terminal pyramidal panicle: leaves numerous, spatulate-linear or narrowly oblanceolate, 2 inches long or more, acutish; carinate by a rather strong and prominent midvein: heads large, often 7 or 8 lines high; involucre and the pedicels distinctly glandular-puberulent, often also tomentulose; bracts about 3 in each vertical rank, all acute: corolla 5 lines long, the slender sparsely short-hairy tube not as long as the subcylindric rather deeply cleft throat; filiform style-appendages scarcely longer than the stigmatic part: achenes with a dense but short appressed pubescence; pappus dull-white, hardly scabrous.

Common in the higher Sierra Nevada of Placer and Nevada Counties, California, and very distinct from all forms of *C. speciosus* by its low stout habit, broad leaves, glandular involucres, etc. It is solely on the strength of a glabrate-leaved state of this that "*Bigelovia graveolens* var. *glabrata*" has been credited to California.

Var. **occidentalis.** More slender and taller; stems less tomentose; leaves narrower but distinctly and rather broadly linear: heads not as long; bracts of involucre abruptly and somewhat cuspidately acute.

In the Coast Range, from Humboldt County southward. Plant not well known.

The species succeeding, are distinguished by a more thyrsiform arrangement of the heads, and with the exception of the last one, by a more sparse and less elongated foliage.

15. **C. frigidus.** *Chrysocoma nauseosa*, Pall. in Pursh?? Stoutish, seldom 2 feet, often less than one foot high, the branches of the season erect, numerous, whitish-tomentose: leaves narrowly linear, seldom 2 inches long, acute, erect or ascending, distinctly white-tomentose, seldom glabrate: heads mostly thyrsoid-panicled, 4 or 5 lines high, bracts in not very distinct vertical ranks, the outer acute, the inner obtusish, all more or less tomentulose and glandular, the margins delicately ciliate at least near the summit: corolla-tube sparingly short-hairy, not at all elongated, widening gradually to the abruptly subclaviform rather deeply cleft throat: style-appendages much longer than the wholly included stigmatic part.

Plentiful on the elevated bleak plains about Laramie, Wyoming, and eastward to the borders of Utah. Without knowledge of the type specimens it is impossible to say whether this plant or our number 13 is the basis of the scarcely published *Chrysocoma nauseosa* of Pursh's Flora.

16. **C. Bigelovii.** *Linosyris Bigelovii*, A. Gray, Pac. R. Rep. iv. 98, t. 12 (1857). *Bigelovia Bigelovii*, A. Gray, Proc. Am. Acad. l. c. 642 (1873). *Aster binominatus*, O. Ktze. Rev. Gen. 315 (1891). Size of the preceding, but erect branches of the season quite slender, reedy and very sparsely leafy: leaves short, involute; involucral bracts in very distinct vertical ranks and numerous (4 or 5 in each rank).

Dry plains of southeastern Colorado and adjacent New Mexico.

17. **C. junceus.** *Bigelovia juncea*, Greene, Bot. Gaz. vi. 184 (1881). *Aster Edwardii* O. Ktze, l. c. 316. Taller and more slender, the broom-like tufts of long erect rush-like branches green and nearly or quite leafless : heads in small fastigiate cymes at summit of the branches ; involucral bracts in vertical ranks, all obtusish : corolla-lobes short, hairy.

Collected only by the present writer, many years since, on bluffs of the Gila River in southeastern Arizona.

18. **C. Mohavensis.** *Bigelovia Mohavensis*, Greene, in Gray, Syn. Fl. 138 (1884). *Aster Mohavensis*, O. Ktze, l. c. 318. Rush-like branches few, stout, flexuous, glutinous, sparingly leafy : leaves an inch long : involucral bracts obtuse : corolla-lobes narrowly lanceolate, glabrous.

Mohave Desert in California ; also in adjacent Nevada.

19. **C. leiospermus.** *Bigelovia leiosperma.* A. Gray, Syn. Fl. 139 (1884). *Aster leiospermus*, O. Ktze, l. c. very like the last in habit and aspect ; readily distinguished by the very short ovate teeth of the corolla, and the completely glabrous achenes.

Southern portions of Nevada and Utah.

20. **C. Parryi.** *Linosyris Parryi*, A. Gray, Proc. Philad. Acad. 66 (1863). *Bigelovia Parryi*, A. Gray, Proc. Am. Acad. l. c. *Aster Harbourii*, O. Ktze, l. c. 316. Stout, a foot high or more, quite leafy, and with ascending branches: leaves linear, narrowed at base, 2 inches long or more, somewhat tomentose like the branches, or glabrate: heads quite thyrsoidly disposed up and down the branches, large, 10 to 15-flowered; involucral bracts lanceolate, attenuate-acuminate: corolla-tube hirsutulous.

Parks of the Colorado Rocky Mountains.

21. **C. Howardii.** *Linosyris Howardii*, Parry in Gray, Proc. Am. Acad. vi. 541 (1865). *Bigelovia Howardii*, A. Gray, l. c. viii. 641 (1873). *Aster Howardii*, O. Ktze, l. c. 318 (1891). *Chondrophora Howardii*, Britton, Mem. Torr. Club, v. 317 (1894). Similar to the last in habit, rather

smaller: leaves linear, firm: heads 5-flowered, the 12 to 15 bracts of the involucre oblong-lanceolate, somewhat arachnoid, the outer gradually, the inner abruptly cuspidate-acuminate: corolla-tube sparingly villous.

Parks of the Colorado Rocky Mountains; but included by Dr. Britton in the list of plants of the Gray's Manual region, I know not upon what grounds.

22. **C. Nevadensis.** *Linosyris Howardii*, var. *Nevadensis*, A. Gray, Proc. Am. Acad, vi. 541 (1865). *Bigelovia Nevadensis*, A. Gray, Syn. Fl. 136 (1884). Taller than the last, the head more elongated, and bracts more numerous, hirsute-ciliate, all with long slender firm but recurved tips.

Eastern slope of the Sierra Nevada in California, and adjacent Nevada.

23. **C. Bolanderi.** *Linosyris Bolanderi*, A. Gray, Proc. Am. Acad. vii. 354 (1868). *Bigelovia Bolanderi*, A. Gray, l. c. viii. 641 (1873). *Aster Bolanderi*, O. Ktze, l. c. 317. Low, somewhat viscid: leaves spatulate-linear, acute, not rigid: heads somewhat corymbose or racemose toward and at the ends of the erect branches, mostly subtended by one or more reduced leaves; involucre 7 to 11-flowered, the bracts few not in vertical ranks, lanceolate-acuminate, the inner very thin, the margins cobwebby-ciliate.

Same range as the preceding, though not closely allied to it, being much more analogous in several respects to *Macronema discoideum*, with which, as I have said before, it is much confused in the herbaria and by collectors. It were perhaps better to refer them to the same genus, *i. e.*, either this to *Macronema*, or that to *Chrysothamnus*. The line between these two genera must be drawn arbitrarily if at all; unless the present one be restricted to that series in which the corollas are shorter and more deeply-cleft, and the style-tips broader and shorter; that is, the series ending with our number 10.

24. **C. Bloomeri.** *Aplopappus Bloomeri*, A. Gray, Proc. Am. Acad. vi. 541 (1865). *Ericameria erecta*, Klatt, teste, A. Gray. *Aster Bloomeri*, O. Ktze, l. c. 317 (1891).

Nothing in the modern history of the asteroid composites was more arbitrary than the making the presence or absence of rays the dividing line between "*Aplopappus*" and "*Bigelovia;*" and the present plant is so intimately related to *C. Nevadensis* that I believe hybrids between them exist. This species is not to be referred to *Ericameria, i. e.*, the amplified *Chrysoma* of this series of papers, because it has neither the involucre nor the style-tips of that genus. Neither is it, as Gray described it, a glabrous shrub. It is very commonly found invested with the woolliness of the present group in some degree, at least when young; and the involucre, as well as the whole floral structure—long style-tips, claviform and merely toothed disk-corollas, etc.—is that of the present group, from which its few proper rays—1, 2 or rarely 3 or 4—can not in reason exclude it. In several particulars this and *C. albidus* are much alike.

Two South American shrubs or small trees, which Dr. Gray proposed to subordinate to his "*Bigelovia,*" are clearly distinct from this *Chrysothamnus* series by having broad revolute-margined coriaceous leaves that are conspicuously veiny, the veins almost pinnately divergent from the conspicuous midrib; by their thinnish obtuse closely appressed and regularly imbricated involucral bracts; their deeply-cleft corollas with linear and spreading segments; their short and lanceolate style-appendages. To my view these are surely a genus, which may be called

NEOSYRIS.

1. **N. hypoleuca.** *Aplopappus hypoleucus*, Turcz. Bull. Mosc. (1851) 177. *Bigelovia hypoleuca*, A. Gray, Proc Am. Acad. viii. 638 (1873).

2. **N. fuliginea.** *Baccharis fuliginea*, HBK. Nov. Gen. et. Sp. iv. 68 (1820). *Bigelovia fuliginea*, A. Gray, l. c.

PLANTS HITHERTO UNDESCRIBED.—I.

By J. Burtt Davy.

Lupinus eximius. Frutescent, 2–3 ft. high, young branches, bracts, and growing parts hirsute with long soft white spreading hairs: stipules broad and semiamplexicaul, adnate for about half their length, those of the lower leaves for more, the free part subulate: leaflets 7–9, silky on both surfaces with longish pubescence, oblanceolate, obtuse, ending in a cusp, 8–10 lines long, $1\frac{3}{4}$—$2\frac{1}{4}$ broad: inflorescence about $1\frac{1}{2}$ in. broad, barely 1 inch in length when the lowest flowers open, but elongating to about 5 in.; bracts caducous 4-5 lines long, incurved and considerably exceeding the buds; pedicels stout, 3 lines long, pubescent; flowers light purplish-blue and white, wings and banner broad.

Plentiful on the highest ridge above Lake Pilarcitos, San Mateo Co., Calif., near the summit of the eastern slope, 20 April, 1895; my No. 1050. Type specimens preserved in the herbaria of the University of California and of Prof. Greene. A very handsome, free-flowering bush, noticeable for its large and delightfully scented flowers, the odor much as in *L. propinquus* and more delicate than in *L. arboreus*, in fact at once recalling the fragrance of a field of *Trifolium repens* in full bloom. The shortness of the inflorescence when the first flowers open is a marked feature.

Senecio Breweri. Perennial?, herbaceous, erect, about 2 ft. high with glabrous, sulcate stems: leaves apparently entirely glabrous; radical leaves tufted, rather long-petioled, lyrately pinnate with cuneate-obovate or subreniform, coarsely toothed leaflets, or deeply pinnatifid; upper cauline smaller, sessile and semiamplexicaul, laciniately 1–2–pinnatifid, the lobes toothed: inflorescence corymbose, peduncles and pedicels long; heads erect, 5–6 lines high, about 4 lines broad; bracteoles few and very short; involucral bracts $\frac{1}{2}$—$\frac{3}{4}$ or even 1 line broad, 10–15 in number, apparently thin and lightly 2-ribbed, their broadly scarious margins overlapping in flower; rays few, broad, light yellow.

Gravelly slopes and hills of Alameda Co. and southwards in California; common. Type Prof. Brewer's No. 512 collected on the Geological Survey of California, 1862, and preserved in the herbarium of the University of California. At once distinguished from *S. eurycephalus* with which it has been confused, by the more numerous heads and corymbose inflorescence, the cut and apparent glabrousness of the foliage, and the broad involucral bracts. The leaves of *S. eurycephalus* bear remnants of tomentum even when the plant is fruiting: the involucral bracts are about 20 in number, narrow, with a thick fleshy midrib leaving a narrow sub-scarious margin; in flower they cohere somewhat, separating irregularly in fruit. The range of the latter plant is more northerly than that of *S. Breweri* and it appears to prefer the neighborhood of streams.

Senecio caulanthifolius. Stems 2 or 3 from a perennial rootstock, erect, simple, about 2 ft. high, clothed when young with very short sparse wool: radical leaves with long slender petioles, narrowly cuneate-ovate obtuse, to lanceolate-elliptical acutish, coarsely and doubly crenate-serrate, roughish above with minute scurf; veinlets reticulate, flexuous: lower cauline leaves long-petioled, pinnatifid; upper smaller and more distant, sessile, semiamplexicaul, laciniate: inflorescence loosely corymbose; heads several; pedicels long; involucres 4 lines high, bracts about 15, broad, 2-ribbed, scarious margined, with few bracteoles, these about ½ their length; rays broad.

Murphy's Camp, Calaveras Co., Calif., May 24th, 1895; my No. 1437. Type specimens in the herbaria of the University of California and of Professor Greene. Readily distinguishable from *S. Breweri* by the foliage and much longer pedicels.

Triglochin concinna. Rootstock perennial, stoloniferous: leaves 4 or 5, 4–6 in. long, usually less than 1 line wide, linear, half-terete, flattened and slightly grooved on the inside, flattened on both sides at the apex: scape slender, wiry 8–13 in. high sometimes attaining 17 in., not densely

flowered: stamens 6, in 2 series: fruits bluntly trigonous, not ribbed, 2–2½ lines long, 1½ line broad, ascending, on pedicels nearly the same length; coccæ 6, free, all fertile.

Abundant in the salt marshes around San Francisco Bay, Calif., together with *T. maritima*; my No. 1116. Type specimens in the herbaria of the University of California and of Professor Greene. In drying for the herbarium the coccæ are apt to become canaliculate on the back, and the shape of the fruit is entirely destroyed.

SPHÆRALCEA ANGUSTIFOLIA, G. Don, var. **violacea.** Size, aspect and general habit of Gray's var. *cuspidata*, but pubescence coarser and, on the stem, less abundant; bracteoles darker colored and much longer, in fact exceeding the buds, and in anthesis exceeding the calyx tube, corolla violet. My No. 36, collected at Painted Cave railroad station on the banks of the Rio Grande, Texas, March 12, 1893. Type specimen in the herbarium of the University of California.

NOVITATES OCCIDENTALES.—XV.

By EDWARD L. GREENE.

Delphinium leucophæum. Slender, erect, simple, 2 feet high, from a cluster of short and thick tuberiform roots; the whole plant puberulent, the stem retrorsely so: cauline leaves divided into 5 linear-cuneiform 3-cleft segments, all linear and callous-tipped: raceme rather long and loose, the pedicels all about an inch long or somewhat less: sepals rather small, oblong and obovate, yellowish white, the spur long, straight, ascending, acutish: lower petals conspicuously woolly-hairy, colored like the petals, the upper apparently dark blue or purple: follicles rather short, erect, puberulent: seeds small, elongated cubical, sharply angled.

Specimens in herb. Calif. Acad., said to have been collected somewhere in Oregon, by T. S. Brandegee.

Boisduvalia bipartita. Erect and simple, or with a few decumbent branches from the base, a foot high or somewhat less, the herbage pale and softly villous: leaves lanceolate and linear-lanceolate, or the floral ovate-lanceolate, all entire or obscurely and remotely denticulate: corolla white, each petal parted almost to the base into two unequal lobes, the smaller one about two-thirds the length of the other: capsule villous: seeds few and large.

Sandy dry bed of the Arroyo del Valle, Alameda Co., California, 14 June, 1895. A most remarkable species, on account of the regularly unequal lobes of the very deeply parted petals; the open corolla invariably appearing as if composed of eight petals, four long and four short.

Aster leucanthemifolius. Annual or biennial, stout, rigid, erect, a foot high or more, somewhat divaricately and quite loosely branching; herbage pale and appearing glaucous, but really cinereous-puberulent as seen under a lens: lowest leaves 2 inches long, spatulate-obovate, coarsely and deeply crenate-serrate, the teeth with a short rigid spinous appendage; cauline leaves similar but scattered and small, $\frac{1}{2}$ to 1 inch long: heads small; involucre turbinate, the bracts with short herbaceous spinescent recurved tips: rays about 20, broad and short.

Southern Nevada, near Candelaria, at an elevation of 6000 ft., Shockley.

Aster inornatus. Apparently perennial, the several equal stems ascending, from a central tap-root and attaining the height of 2 or 3 feet; herbage pale, obscurely puberulent: leaves few, narrowly oblanceolate, remotely and slightly serrate-toothed, the cauline much reduced: heads short-peduncled or subsessile on the upper part of the stem and along the few short virgate branches: involucre turbinate, 5 lines high; bracts very numerous, not spinescent but abruptly squarrose at tip, and with sessile glands along the edges: rays none: teeth of disk-corollas pubescent: pappus almost barbellulate.

Plentiful on the plains of Shasta River, Siskiyou Co., Calif., apparently collected only by the present writer, in 1876. Both this and the preceding are of the *Machæranthera* subgenus.

Linanthus serrulatus. Freely and almost diffusely branching, 6 or 8 inches high, green and seemingly glabrous but the branches pubescent: leaf-segments and floral bracts all linear-acerose, glabrous, but the margins spinulose-serrate; calyx-segments more than twice the length of the tube, remotely serrate-ciliolate: corolla with slender dark-purple not far exserted tube, and narrowly funnelform throat, the limb of oblong-spatulate white segments expanding to the diameter of $\frac{3}{4}$ inch.

Near Madera, California, 1889, Mr. Buckminster.

Linanthus montanus. *L. ciliatus*, var. *montanus*, Greene, Pitt. ii. 260. Habit of *L. ciliatus* but larger, less hispid: corolla many times larger, nearly 2 inches long, with elongated tube gradually widening to a broadly funnelform purple throat, the limb of cuneate-obovate truncate whitish segments $\frac{1}{2}$ inch broad, yet apparently expanding not to the rotate, but only to the wide-funnelform.

Common at middle altitudes of the Sierra Nevada from Nevada Co., southward to the San Bernardino Mountains, from which southern station Mr. Parish has distributed it for *L. androsaceus*, to which it is not intimately related.

Linanthus nudatus. Slender, 3 to 10 inches high, with few and divergent branches; lower internodes not exceeding the short ($\frac{1}{4}$ inch long) leaves, the upper $1\frac{1}{2}$ to 3 inches long or more: branches puberulent: ordinary leaf-segments hispidulous-ciliate, the floral villous-ciliate: calyx scarious between the angles, the segments hirsute-ciliate: corolla with very slender long-exserted tube, short yellow throat, and white or purplish limb $\frac{1}{2}$ inch broad.

Probably common in Lake County, California. Well marked by its short foliage, long naked internodes and dense clusters of small flowers.

Linanthus luteolus. Very diffusely branching, 3 to 6 inches high, rather roughly hirsute-pubescent throughout, the leaves and leaf-like organs all destitute of any special marginal ciliation: mature calyx 5-parted almost to the base, perhaps when young less deeply cleft and with narrow scarious spaces below the sinuses: corolla yellow, with very slender tube, no throat, and a rotate limb about $\frac{1}{3}$ inch broad.

Cuyamaca Mountains in southern California, G. R. Vasey, June, 1880, and in Lower California, Mr. Orcutt, 1889.

All the foregoing new *Linanthus* species are of the *Leptosiphon* subgenus.

Sisyrinchium sarmentosum, Suksdorf in herb. Stem and leaves very slender, apparently ascending, 6 to 10 inches high: spathes very unequal, far exceeding the few pedicels: ovary and perianth delicately puberulent, the latter light blue, small, the segments all abruptly but slenderly acuminate: seeds very small, broadly pyriform, delicately but very regularly sinuate-rugose.

Borders of wet meadows in Skamania Co., Washington, at altitudes of 2,000 or 3,000 feet, August, distributed by Mr. Suksdorf under the above name, the fitness of which does not appear from the specimens, though the stems are said to be "sometimes rooting at the nodes." The species is an excellent one; the segments of the perianth not being in any degree notched at the apex, or even truncated, but simply acuminate.

SUNDRY PROPOSITIONS,

Commended to the consideration of the most northwesterly editor of the Botanical Gazette.

When an editor prefaces his contributor's paragraphs with words of sympathizing commendation, he is naturally ready to defend the matter thus contributed.

The words Latin and latinity are, in the last *Gazette*, assumed to be synonymous. Before printing this, our editorial friend should have instructed himself on the important point, that dictionaries of Latin and of latinity are books of widely different scope and character.

Latinity is Latin plus many other things, including whatever rubbish of barbarian and mongrel verbal jugglery and clap-trap with Latin endings of *us*, *a*, *um*, etc., those innocent of grammar have fabricated and left on written record in ancient, or mediæval, or modern times.

When there is question of such names as *elatiocarpus* or *versicolorcarpus*, of course a *Lexicon of Latinity*, and even of *All Latinity* must needs come into requisition. No Lexicon of Latin would serve but to condemn. *Latin* never knew, nor can ever know such terms.

Query. Will not old friends of the *Gazette* hide in deep humiliation confused faces, as they read on a page of this valued journal such brazen statements as that *brevifolia* and *breviflora* are mongrel terms, half Greek and half Latin, and that *cuspidocarpus* and *lanocarpus* are Latin legitimate and pure?

Query. When our two friends of the northwest, the Editor and the Astragalologer, combine their grammatic and literary skill in efforts to make another man appear given to hasty and unseemly speech in criticism, do not their sentences recall with delightful freshness, the homely half-forgotten fable of the pot that called the kettle black?

E. L. G.

PRINCIPAL BOTANICAL WRITINGS OF PROFESSOR GREENE.

NEW SPECIES OF PLANTS FROM NEW MEXICO. Four papers in *Botanical Gazette*, Vol. vi., 1881.

NEW PLANTS of CALIFORNIA, ARIZONA AND MEXICO. Nine papers in *Bulletin of the Torrey Botanical Club*, Vols. ix. and x., 1882-83.

STUDIES IN THE BOTANY OF CALIFORNIA AND PARTS ADJACENT. Six papers in *Bulletin of the California Academy of Sciences*, Vols. i. and ii., 1885-87.

BIBLIOGRAPHICAL NOTES ON WELL KNOWN PLANTS. Ten papers in *Bulletin of the Torrey Botanical Club*, Vols. xiv.—xvii., 1887—90.

PITTONIA. A series of Eighty-Seven Papers, in Two Volumes, pp. 617, 1887-92. Published by the author. Price $2.50 per volume.

ILLUSTRATIONS OF WEST AMERICAN OAKS. One Volume, 4to, pp. 79, with Thirty-Seven Plates, 1889-90. Published under the patronage of James M. McDonald, of the Pacific Bank, San Francisco.

FLORA FRANCISCANA. An attempt to classify and describe the Vascular Plants of Middle California. Parts i., ii. and iii. (pp. 352, 1891-92) finished. Price $2.00.

MANUAL OF THE BOTANY OF THE REGION OF SAN FRANCISCO BAY. A Systematic Arrangement of the Higher Plants growing Spontaneously in the Counties of Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo and San Francisco, in the State of California. One Volume, 8vo., pp. xiii., 328, 1894. Price of library issue, $2.00; of school issue, single copy, $1.75.

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AND OTHERS, OF THE DEPARTMENT OF BOTANY,

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NOVITATES OCCIDENTALES.—XVI.

By Edward L. Greene.

Clarkia virgata. Allied to *C. rhomboidea*, but almost cinereously puberulent throughout, and 2 or 3 feet high, with long suberect virgate branches rather densely floriferous throughout: leaves not thin, oblong-lanceolate, obtuse, 1 inch long or more: petals 4 lines long, rhombic-ovate, usually obscurely 3-lobed, retuse or emarginate, purple, dotted in the middle with dark red, the broad claw usually toothed: capsule 1 inch long, taper-pointed, scarcely incurved.

Species known to me only from Sonoma and Amador Counties, California, the collectors Mr. Bioletti and Mr. Hansen. The description of *C. rhomboidea* in the State Survey Botany seems made to cover both that species and this; but that has few ample thin leaves, few and scattered flowers, entire petals, and a pod which is short and stout as well as incurved almost to the semicircular.

Eriophyllum obovatum. Stem a foot high from a perennial root; branches few, stout, erect or ascending from a decumbent base, leafy up to the monocephalous terminal peduncles; only the lowest leaves opposite, and all, together with the branches, peduncles and involucres, densely white-tomentose: leaves all entire, an inch long or more, from obovate-spatulate to broadly oblanceolate: heads large, hemispherical; involucral bracts broad and few, apparently united toward the base: rays light yellow: corolla-tube glandular-hispidulous: achenes glabrous: pappus conspicuous, of about 8 very unequal paleæ, the longest being lanceolate, remotely lacerate-toothed, the others very short and obscure.

On the San Bernardino Mountains in southern California, at an altitude of about 5,000 feet, W. G. Wright and others;

in the *Synoptical Flora* appended to the low and cespitose *E. integrifolium* of the far North, from which it is perfectly distinct.

Eriophyllum croceum. Slender, the several decumbent stems 8 to 18 inches high: foliage silky-lanate beneath, glabrate above: leaves of narrowly cuneate-obovate outline, of thin texture and coarsely toothed or lobed above the middle: monocephalous peduncles several, terminating the branches: heads hemispherical: bracts of involucre thinnish, 10 or 12; saffron-colored showy rays about as numerous: corolla-tube short, densely hispid: achenes sharply 4-angled, the angles toward the base white-callous: pappus of the ray none, of the disk of 4 very short and blunt somewhat incurved callous points rather than paleæ.

A most distinct species of the Amador and Calaveras County hills, collected by Mr. Hansen and also by Mr. Blasdale.

Erigeron Blasdalei. Stems a foot high, slender, rigid, tufted and decumbent from a ligneous base, equably leafy up to the terminal head or corymb of heads: leaves numerous, very narrowly linear, plane, 1½ inches long or more, minutely and sparsely strigose-pubescent: heads 1 to 5, a half inch broad or more; bracts of the involucre linear-acuminate, imbricated in about 3 series: rays of medium width, very numerous, violet: achenes linear, strigose-pubescent but very sparsely so, and with lateral marginal rib but nerveless on the face: pappus-bristles slender, white.

In dry rocky soil, on the Stanislaus River, Calif., near McCormick's Bridge, 10 June, 1895, W. C. Blasdale.

Senecio triangularis, Hook., var. **Hanseni.** Stems only 1½ or 2 feet high, slender, decumbent at base: leaves smaller than in the type, and of less angular outline, the lowest somewhat cordate-ovate, those of the middle part of the stem deltoid-ovate, the margins of all often merely denticulate: cluster of heads small and dense.

Type from Calico Lakes, Alpine Co., Mr. Hansen. It has also been received from the Yosemite, and elsewhere in the higher Sierra. The not deep-seated root, the decumbent stems, etc., seem to indicate that it is a plant of dry ground, whereas the typical *S. triangularis* is of marshy places.

Allocarya vestita. Annual, stout, suberect or ascending, 2 feet high or more, the ample linear-lanceolate leaves strigosely, the branches and inflorence more densely and stiffly hirsute: flowers and fruit in many somewhat short and dense bractless spikes: nutlets narrowly ovate, $\frac{3}{4}$ line long, not carinate on the back, but very conspicuously and regularly favose-reticulate and the surface within the meshes strongly tuberculate, the ventral face very strongly carinate down to the suprabasal ovate-lanceolate scar, this surrounded by a horse-shoe-shaped ridge.

Allied to *A. mollis*, a low soft-villous perennial whose nutlets are marked on the back by low transverse rugæ which are as far as possible from running into any kind of reticulation, and the scar of which is on a level with the general surface, with no trace of an encircling mark or ridge; the whole nutlet being dull and pale, whereas that of this new species is dark and vitreous. I have my type specimen from Mr. J. W. Congdon, said to have been collected near Petaluma, California, in 1880.

Allocarya myriantha. Annual, diffuse, the slender prostrate or trailing branches commonly 1 to $1\frac{1}{2}$ feet long, leafy below, floriferous throughout: flowers of the leafy and lower parts of the branches on short and slender pedicels, all the others subsessile and forming close unilateral spikes: corollas white, $1\frac{1}{2}$ lines wide: nutlets rather narrowly ovate, about $\frac{3}{4}$ line long, dark-brownish and somewhat vitreous-glossy, marked dorsally by prominent obtuse transverse and more or less sinuous ridges, and numerous low tuberculations, the narrowly linear scar and distinct keel lying within a narrow groove formed by the closely approximated and thus quite displaced lateral angles.

Plentiful in low places in meadows and fields about Monterey, California. It may probably be found to be one of the components of the *Myosotis Chorisiana* of Hooker in the *Botany of Beechey's Voyage*, but it is not the plant on which Chamisso founded his species; for that was the well known *Allocarya Chorisiana* of the San Francisco region. The two plants are somewhat nearly alike in aspect; but the nutlets of the new species are very unlike those of *A. Chorisiana*, and far more nearly resemble those of *A. Hickmani*.

Calliprora scabra. Seldom more than 6 or 8 inches high, the margins of the 1 or 2 leaves, and also the scape and pedicels in lines distinctly and somewhat retrorsely scabrous-serrulate: perianth with broad obtuse or retuse segments: forks of the filaments very slender and erect: anthers white.

Var.? **anilina.** Only slightly scabrous-serrulate; the very slender pedicels scarcely at all so and purplish: anthers blue.

Both these plants are common in the middle Sierra Nevada of California. They have long been recognized by me as wholly distinct from the Coast Range type of this genus. The question has been, whether in the Sierra we have a single variable species, or whether we have two or three; and this question still remains. The form with white anthers I have placed as the type of the species for the reason that the almost prickly roughness is most pronounced in this; but the plant with intensely blue anthers is that which at a glance looks still more unlike *C. ixioides*.

A NEW ERYTHRONIUM.

By Henry N. Bolander.

Erythronium Johnsonii. Corm 1½ to 2 inches long, thinly coated, new ones evidently produced by offshoots from the base of the corm. Scape 10–12 inches high; flower buds 1¼ inches long; segments 1½ inches long, acuminate, three inner segments appendaged or auricled. Leaves two, 5–6 inches long, lanceolate, 1¼ inches wide, strongly mottled. Style ⅜ to ½ of an inch long. Stigmas three, long and spreading. Anthers ⅜ of an inch long, bright yellow; filaments shorter, dilated. Capsule oblong-obovate, obtuse above. Color a bright pinkish rose outside, inside golden orange, deepening to a dark purple.

Coast Ranges of southern Oregon. May. Collected by A. J. Johnson.

MISCELLANEOUS NOTES AND NEWS.

Professor E. L. Greene has resigned his position as head of the Department of Botany in the University of California and accepted the professorship of botany in the Catholic University of America, in Washington, D. C. At his new seat of activity Professor Greene expects for the present, at least, to be able to devote practically all his time to research work and, in addition, possess the advantages of access to the various Government collections and libraries. The best wishes of his former associates go with him to his new home.

Professor Lester F. Ward, the distinguished paleobotanist of the Smithsonian Institution, Washington, D. C., will visit the Pacific Coast during the coming autumn months for the purpose of making collections and examining certain localities in the Sierra foothills.

C. C. Babington, one of the foremost authorities on British plants, died recently at Cambridge, in his eighty-seventh

year. He was best known as the author of the Manual of British Plants, which was very widely used and passed through eight editions. The following comment is taken from the *Gardeners' Chronicle:* "Babington was very keen in discriminating slight differences, the value of which has been greatly enhanced since the general acceptance of Darwinian views of evolution. His tendencies in this direction led to his being classed among the 'splitters,' rather than the 'lumpers,' by a former generation of botanists less appreciative of the significance of minute differences." It may be mentioned that he was one of those who worked on British brambles, and that his results were successful attests his fine analytical powers.

Miss Alice Eastwood has been studying the heteromorphic foliage of *Sequoia sempervirens* and contributes a paper on the subject to the Proceedings of the California Academy of Sciences published May 13th. From her observations the author concludes that all large trees of *Sequoia sempervirens* have the upper foliage consisting of short stout closely appressed leaves, with gradations to the expanded distichous leaves of the lower branches; further, that this generalization is not true of *S. gigantea.* Figures of cross-sections of the scale-like leaves of *S. sempervirens* and of the leaves of *S. gigantea* show an interesting similarity in form and structure between the species.

D. C. Eaton, Professor of Botany in Yale University and the greatest authority on North American ferns, died at his home in New Haven June 27th. Professor Eaton is one of the last of that generation of famous botanists of which Gray was the central figure. His grandfather was Amos Eaton, whose Manual of the Botany of North America was so popular that as many as seven editions were issued between 1817 and 1836. D. C. Eaton's greatest work is the illustrated volumes on the Ferns of North America, but he produced very much besides this; hardly a manual,

flora or report has been published in the last thirty years for which Eaton has not elaborated the Ferns and their allies. He wrote that part of the Botany of California treating of the "Vascular Acrogens." In 1869 he was with Clarence King's expedition in the Great Basin and contributed the Compositæ for the "Botany of the Fortieth Parallel."

JAMES DWIGHT DANA, the geologist and mineralogist and author of the "System of Mineralogy" and "Manual of Geology," of many editions, died in April at New Haven. He took a lively interest in botany in his student days and while attached to the Wilkes expedition made the overland journey from Oregon to California in 1841. While with this party he aided in gathering botanical specimens. The "California Collection," although a small one, was one of the first ever made in the interior of California. Professor Dana has been for fifty years one of the editors of the *American Jonrnal of Science.*

THE "Russian Thistle" of fame has at last been reported from several points in California. The production of literature concerning the pest will doubtless receive a new impulse.

THE next meeting of the American Microscopical Society will be held at Cornell University in Ithaca, New York, August 21, 22 and 23, 1895. Many opticans have expressed a desire to be present and make an exhibition of their microscopes and microscopical apparatus, thereby affording the members an opportunity to see all the new and standard apparatus. The subject of the exact standards of length, vital to every user of the microscope, will receive consideration. The University possesses one of Roger's dividing engines and the Department of Physics will show the members exactly how micrometers are made. The Department also has a large comparator for testing micrometers. This is the original one used in determining the exactness of the

rulings of our standard centimeter. In the proceedings of the Society are published papers upon the microscope, its manipulation and accessories, and also the results of investigation in which the microscope plays an important role. A special feature of the coming meeting will be the setting apart of one or more sessions for the reading of papers on methods and the demonstration of special or new methods. The Chairman of the local committee, Professor W. W. Rowlee, or the President will be glad to receive requests from those who desire to have some specially difficult method or structure elucidated.

WILLIAM M. CANBY of Wilmington, Delaware is now in California. This journey is only secondarily for botanical purposes.

W. C. BLASDALE spent a portion of the months of May and June in the High Sierras about Yosemite. His collection while not extensive contains much valuable material.

IT IS rumored that publication of the Synoptical Flora of Northern America left unfinished at the death of Asa Gray is soon to be resumed. The Polypetalæ as worked out by Dr. Robinson is said to be nearly ready for the printer. The completion of this large undertaking is earnestly to be desired.

MR. MARSHALL A. HOWE visited Vermont during June and July. He returned with a harvest of lichens.

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ERYTHEA

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EDITED BY

WILLIS LINN JEPSON

AND OTHERS, OF THE DEPARTMENT OF BOTANY,

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ERYTHEA

A MONTHLY journal of Botany, edited by members of the Department of Botany at the University of California. Devoted to every department of botanical investigation and criticism. . . Historical papers, general articles on systematic and geographic botany, and miscellaneous notes and news, will continue to be features of the journal.

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OBSERVATIONS ON PUCCINIA MIRABILISSIMA.

By Walter C. Blasdale.

Under the name of *Puccinia mirabilissima* Peck described in the Botanical Gazette, Vol. 6, page 226, the uredo- and teleutospore stages of a species of *Puccinia* found in Utah on the leaves of *Berberis repens*, and in a subsequent volume of that Journal (Vol. 13, page 126) Messrs. Tracy and Galloway reported the supposed discovery of its æcidial stage. The fungus has since been reported from Montana by Kelsey, from Colorado by Baker (Fungi Columbiani, No. 186), and from the Sierra Nevada Mountains by Harkness (Fungi Europæi, No. 3619), in all cases on the same host-plant. I have also found it on this host quite widely distributed throughout the central portion of the Sierra Nevadas, and in a single locality near Berkeley on *Berberis pinnata*. Its many peculiar characters have induced me to undertake a study of some of the important points in its life-history and I would here present such facts as I have been able to determine.

In the vicinity of Berkeley the uredo- and teleutospores are to be found throughout the year but are produced in greatest abundance during two cycles of development, one during the month of November or December and immediately following the early winter rains, and the other during the months of April and May. The spores of both stages occur in the same sorus on bright reddish spots on the under surface of the leaves; the percentage of teleutospores increasing somewhat with the age of the sorus.

The uredospores vary from obovate to pyriform, are delicately rugose and are borne on colorless pedicels, to which they are attached by a distinct articulation and from which they separate only at maturity. Each spore contains from two to four æquatorially arranged germ-pores. The average of the measurements for ten normally developed spores was 22x26.5μ.

The teleutospores are elliptical or oblong, pronouncedly constricted at the septum and covered with small wart-like processes somewhat larger than those of the uredospores and arranged in such a manner as to suggest a slightly rugose appearance. They are borne on pedicels of prodigious length, 90 or 110μ being not uncommon measurements, and occasionally these also bear a few warts. The lower portion of the pedicel in recently matured specimens is much swollen and when dried often shows lateral folds evidently pointing to an apparatus for the dissemination of the spores similar to that recently observed by Dietel.* The average of the measurements for twenty normally developed spores was 23x33μ. A second fact that renders the teleutospores of this *Puccinia* anomalous is the possession of two germ-pores for each cell as first observed by Lagerheim. These can be detected without the aid of reagents in mature spores but become very prominent after treatment with a strong solution of caustic potash or sulphuric acid. They are situated at opposite points of the spore-wall about midway between the septum and either end of the spore and are practically in the same plane for both cells. A most interesting series of abnormal spore formations can be observed by the examination of a considerable number of specimens. Nearly every good-sized sorus will present three- and four-celled forms in which the cells assume a great variety of positions.

What may be the æcidia of this fungus develop during the months of May and June but in such limited numbers that it is difficult to secure even a reasonable herbarium specimen. At this time characteristic thickened spots of a deep purple or even black color appear on the recently developed but mature leaves, sometimes attaining a diameter of 2mm. and bearing all the way from three to thirty peridia. The latter are small, seldom exceeding 16mm. in diameter, tall, pale yellow, and with much lacerated edges. Spores are subglobose, light lemon yellow and vary from 17μ to 20μ in diameter.

---

*Ueber Quellungserscheinungen an den Teleutosporenstielen von Uredineen. Pringsheim's Jahrbücher f. w. Botanik, Bd. XXVI, heft I.

The specific connection between this *Æcidium* and the previously described *Puccinia* is by no means well established. I find no reason for distinguishing it from the *Æcidium* from Utah described by Tracy and Galloway and the association of the two forms from the two localities is the only evidence we have for assuming this relationship. I also have specimens of *Berberis repens*, collected by Holway in Colorado, bearing on the same leaves the uredo stage of *Puccinia mirabilissima* and an *Æcidium* that seems to be distinct from the one under consideration. It occurs in large groups on yellow unthickened spots and is larger and shorter than the one found at Berkeley. Its spores are more nearly subglobose and vary from 21μ to 23μ in diameter. In addition to these facts are those observed by Mr. T. D. Cockerel who finds in Colorado an *Æcidium* that he believes to be identical with that of Tracy and Galloway but after careful search is unable to find even a trace of Peck's *Puccinia*.

Culture experiments alone can show the existence or non-existence of this relation and these have proved somewhat difficult to carry out. I made two attempts to produce æcidia by sowing the uredo and teleutospores on detached leaves under a bell jar but in both cases without results. I hope to be able to carry out more satisfactory cultures as soon as suitable young plants can be grown.

A comparison of the fungus found at Berkeley with that of the Sierras gave almost identical results. The average of teleutospore measurements was 23.2x33.2μ instead of 23x33μ and uredospores show a similar agreement. No *Æcidium* on *Berberis* as far as I know has been reported from the Sierras.

The germination of the uredo- and teleutospores was readily observed by the usual method of hanging-drop cultures for which distilled water was found to be the most satisfactory medium.

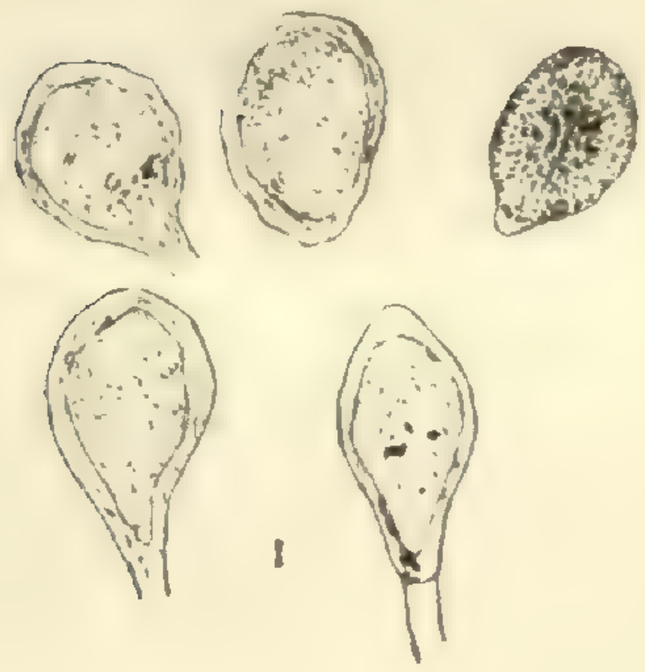
Under such conditions the uredospores begin to germinate abundantly at the end of twelve hours; frequently two and sometimes three of the germ-pores giving rise to germ-tubes

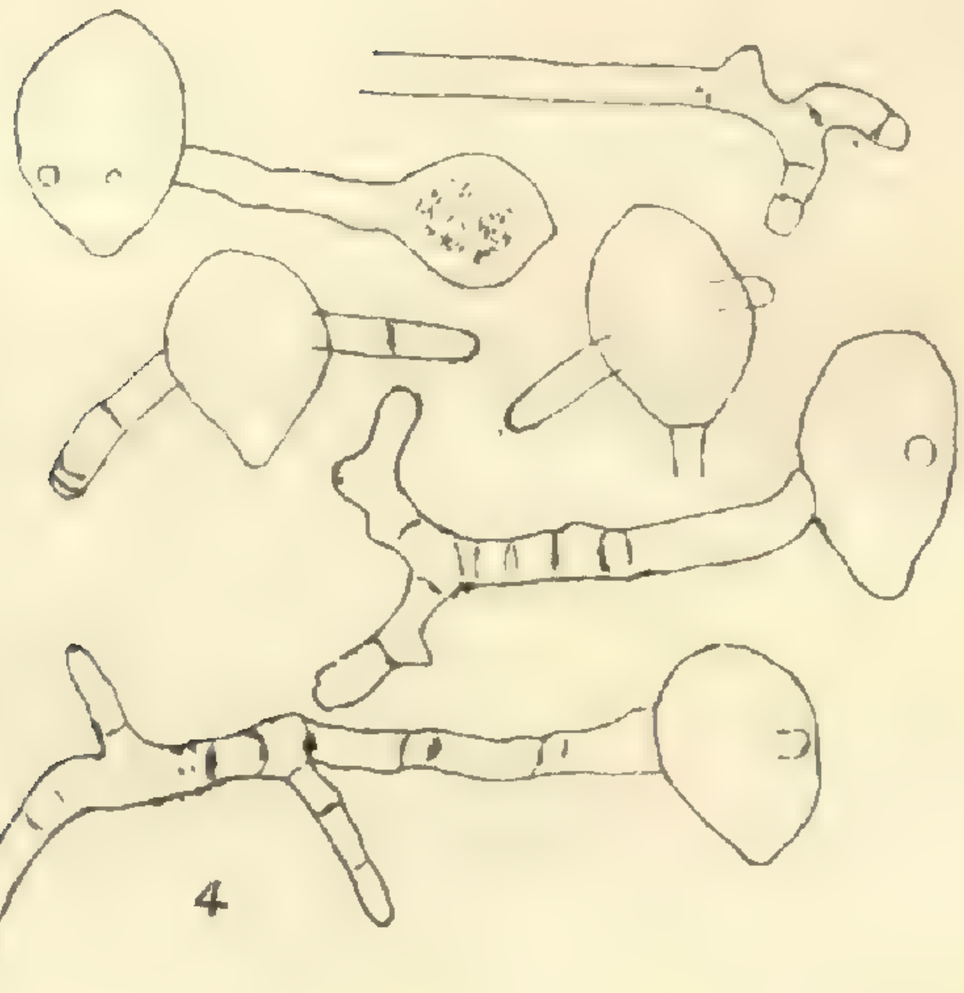
almost simultaneously. These may continue to develop almost uninterruptedly with the ultimate formation of a long, flexuous, non-septate mycelium but more commonly they proceed but a short distance before breaking up into two or three branches. In a number of instances the germ-tubes give rise almost immediately to an enlarged cystose body into which is collected much of the protoplasmic contents of the spore in the form of orange granules. The subsequent development of these resting spores was not observed.

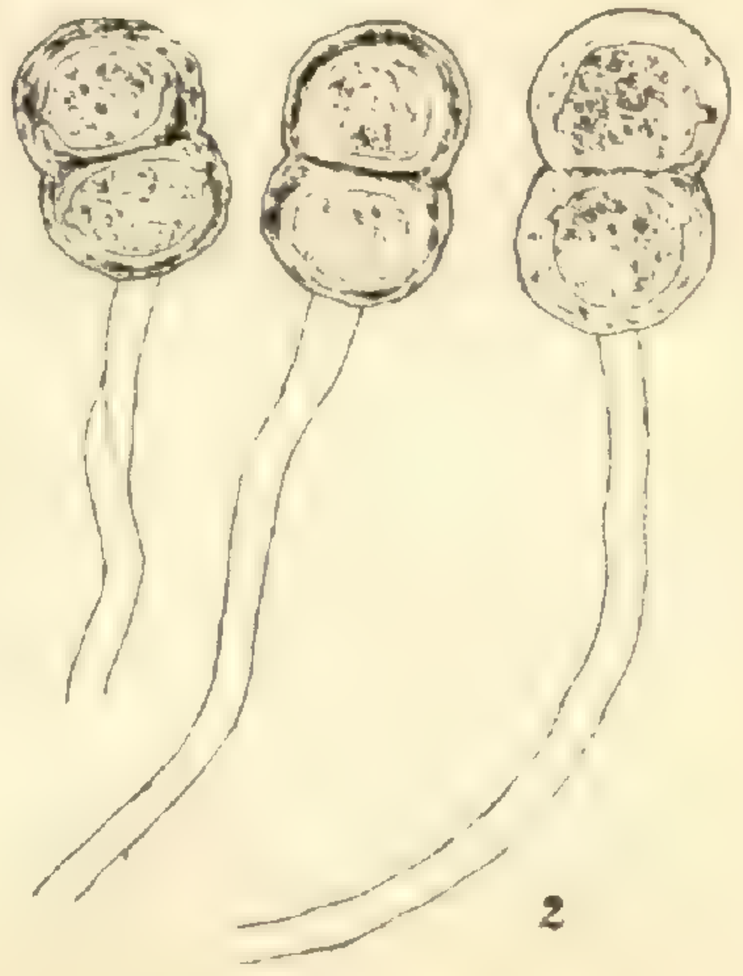
The successful germination of the teleutospores is much more difficult to obtain. Thoroughly mature spores however will generally begin to show evidences of germination at the end of twelve hours and about six hours later will have produced a germ-tube of considerable length. As far as observed only one of the two germ-pores develops and when both cells of a spore germinate it is almost invariably pores on opposite sides of the spore from which the germ-tubes are emitted. Immediately after the protrusion of one of these germ-tubes orange colored bodies begin to collect at the distal end and from this arises a contorted promycelium which becomes septate at frequent intervals. As soon as this promycelium has attained a length equal to four or five times the length of the spore a number of its cellular divisions give rise to short thick branches, one from each division, on which are borne oval or pyriform promycelial-spores, the whole process differing in no essential feature from that which has been observed in such well known species as *Puccinia graminis*. The germination of these promycelial-spores was not observed.

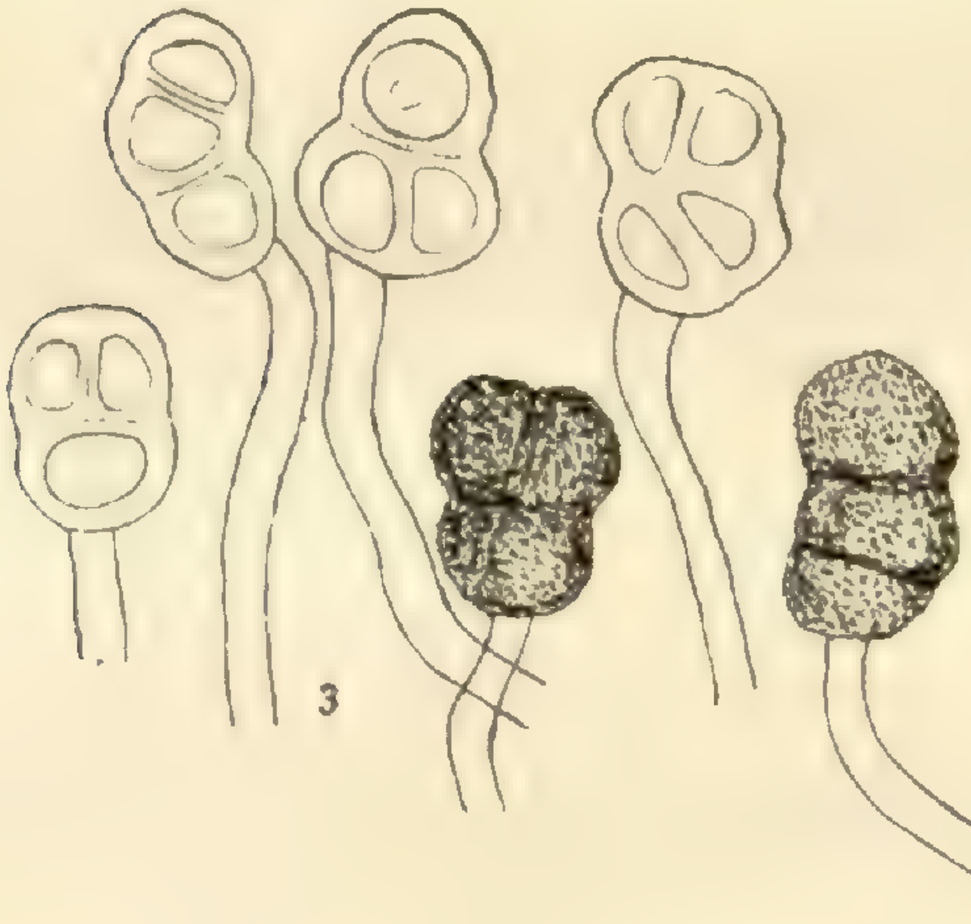
I have endeavored to illustrate these observed facts by the accompanying drawings all of which have been prepared from camera-lucida sketches using the same magnifying combination in all cases.

In conclusion I would call attention to the peculiar position occupied by this fungus as one of the possible connecting forms between the genera *Puccinia* and *Phragmidium*. In the Journal of Mycology, Vol. 6, pp. 112–113, Lagerheim









Puccinia mirabilissima, Peck.

enumerates the various facts leading to this view with great clearness and also intimates that germination experiments might add still more evidence. My experience seems to show that this is not the case. The only additional argument I would here advance is derived from the abundance of three- and four-celled spore forms for I think that it must be admitted that the presence of such a large number of these peculiar spore-formations shows an inherent tendency on the part of this fungus to assume characteristics peculiar to the genus *Phragmidium*.

EXPLANATION OF PLATE.

Fig. 1. Uredospores in different stages of maturity, show ing also their articulation with the pedicel.

Fig. 2. Teleutospores distended with caustic potash and showing the position of the germ-pores.

Fig. 3. Some of the peculiar three- and four-celled teleutospore formations.

Fig. 4. Germination of the uredospores.

Fig. 5. Germination of the teleutospores.

Fig. 6. Promycelia from the teleutospores developing promycelial-spores.

TRANSCRIPTS OF SOME DESCRIPTIONS OF CALIFORNIAN GENERA AND SPECIES.—V.

By J. Burtt Davy.

Silene (Melandryum) Tilingi, E. Regel. [1]

Perennis. Caules adscendentes, plus minus ramosi, puberulo-hirtuli. Folia opposita, ovata v. ovato-oblonga, acuta, inferiora in petiolum brevem attenuata, superiora subsessilia, puberulo-hirta. Flores in cymam foliosam glanduloso-puberulam paucifloram dispositi, initio terminales solitarii, deinde alares. Calyx cylindricus, vix inflatus, pedunculum superans, decemstriatus, glanduloso-puberulus; striae concolores, superne v. a medio venis anastomosantibus conjunctae; dentes anguste lanceolati, attenuato-acuti, angustissime hyalino-marginati, margine glanduloso-puberuli. Petala coccinea; unguibus glabris inclusis; lamina quadripartita, lobis medianis oblongis bilobis, lateralibus anguste linearibus acutis brevioribus; appendicibus brevibus denticulatis. Capsula (in statu immaturo) elliptico-oblonga, carpophorum circiter duplo superans, stylis 3 filiformibus coronata.

Affinis S. laciniatae et Greggii. Prima foliis lanceolatis v. lineari-lanceolatis, inflorescentia racemosa eglandulosa, calycis paullo ampliati striis anastomosantibus dentibus late albo-marginatis ciliatis,—altera racemi ramis plerumque unifloris, calycis dentibus late albo-marginatis obtusis dignoscitur.

Semina legit Cl. Tiling in California prope Nevada City.

---

[1] *Animadversiones de Plantis vivis nonnullis Horti Botanici Imperialis Petropolitani*, auctore E. Regel, p. 99. [Published in *Acta Horti Petropolitani*, Tom. i, pp. 89–100, (1871–72): also issued as an excerpt with pages numbered 1–12.]

The thanks of myself and others who may benefit by these transcripts are due to Miss Eastwood, Curator of the Herbarium of the California Academy of Sciences, for permission to copy the originals of this and the following of Regel's descriptions.

HORKELIA TILINGI, E. Regel, [2] foliolis apice 3–5 dentatis.—Caule erecto, pedali et ultra, basi laxe patenti—hirsuto, apicem versus glabro; foliis praecipue ad marginem laxe villosis, pinnatis; foliolis 5–9, foliorum radicalium ovato-oblongis, pollicem et ultra longis, fol. caulinorum cuneato-oblongis, omnibus apice 3–5 dentatis, cæterum integerrimis; stipulis palmatifido-laciniatis, laciniis linearibus; cymis pedunculatis, subcapitatis; pedicellis calycibusque glanduloso-pubescentibus; calycibus pedicellum superantibus, segmentis accessoriis linearibus, quam vera triangulari-lanceolata subduplo brevioribus; petalis albis, linearibus, calycis segmenta circiter aequantibus; staminibus 10; filamentis angustis subfiliformibus.

In California prope Nevada city, legit Cl. Tiling.

ASTER SCORZONERIFOLIUS, E. Regel [3]; perennis; caule circiter 25 c. m. alto, simplici, folioso, basi glabro, apicem versus puberulo; foliis radicalibus linearibus, longissimis, caulem superantibus v. æquantibus, canaliculatis, integerrimis, plerumque 5-nerviis, glabris; foliis caulinis 9–10, sessilibus, e basi latiore lineari–lanceolatis, integerrimis, decrescentibus, inferioribus glabris trinerviis, superioribus uninerviis, margine v. undique puberulis; capitulis pro genere maximis, in apice caulis solitariis v. rarius in ramulo bevi axillaribus; involucri late campanulati squamis imbricatis, 5-serialibus, canescenti-puberulis (nec glandulosis), lineari-lanceolatis, acutis, apice laxe patulis, quam flores disci brevioribus; ligulis pallide-violaceis, lineari-lanceolatis, apice acutis integris v. minute bidentatis, patulis, 15 c. m.

---

[2] *Revisio Specierum Crataegorum, Dracaenarum, Horkeliarum, Laricum et Azalearum:* auctore E. Regel, p. 153 [Published in *Acta Horti Petropolitani* Tom. i, pp. 101–164, (1871–1872): also issued as an excerpt with pages numbered 1-64. Though the title-page of this volume bears date 1871–1872, pages 283 to 586 comprise an article by F. von Herder which is dated at the end "St. Petersb. d. 13. (25) Febr. 1873."] *Horkelia Tilingi* was figured in *Gartenflora* 1872, t. 711: it is the *Potentilla Tilingi* of Professor Greene.

[3] *Acta Horti Petropolitani*, ii. 308 (1873): *Gartenflora*, 1873, p. 1.

longis, involucrum duplo superantibus; floribus disci flavidis, stylo longe exserto; stigmatis lobis linearibus, erectis, undique papillosis; achæniis hirtis, pappo flores disci superante coronatis.—Habitus A. alpini. Proxime A. Kingii, Wats. (in Report of the Geological exploration of the fortieth parallel, volume V., Botany, by Sereno Watson pag. 141. tab xvi) affinis. Posterior caule 2–3 pollicari, foliis radicalibus caule brevioribus lanceolato-spathulatis basi ciliatis, foliis caulinis paucis (2–3), involucro glanduloso-pulverulento, ligulis brevioribus albis, stylo incluso, stigmatibus tantum breviter exsertis facile dignoscitur. Semina cl. Roezl in Californiae Sierra Nevada collegit.

MISCELLANEOUS NOTES AND NEWS.

ANOTHER of the handsome volumes from the Missouri Botanical Garden has come to us in the shape of the Sixth Annual Report. The scientific papers contained therein have for the most part been issued separately in advance. With these are fifty-six plates. This volume in itself is abundant evidence, if evidence be needed, that the endowment of Henry Shaw is under wise control.

HENRI BAILLON, the most distinguished French botanist of the time, died in the latter part of July. The wide celebrity which he enjoyed was largely attained by the production of the "Histoire des Plantes" and "Dictionnaire de Botanique." He was an ardent admirer of Adanson and was the editor of *Adansonia* during the life of that periodical.

PROFESSOR E. L. GREENE, who has been botanizing for several weeks in the Sierras, in Nevada and in Wyoming, is now located in his new quarters in the Catholic University, Washington, D. C.

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NOTES ON THE GENUS NEMOPHILA.

By F. T. Bioletti.

Among the most noticeable of Californian annuals are the showy Nemophilas of the Menziesii group. About half a dozen species have been described by various authors, namely, Douglas, Bentham, Hooker and Arnott, Fischer and Meyer. These in Gray's Flora of North America were reduced to two, *Nemophila insignis*, Dougl., and *N. Menziesii*, H. & A. *N. pedunculata*, Benth., a species which properly belongs to this group, although the flowers are minute, has been recognised by Prof. Greene in the "Manual of the Botany of the Bay Region." Most of the species originally described were known to their authors in the fresh state, while the uniting of species has been done principally by those who have studied the plants as dried specimens.

The characters which have been chiefly used in the differentiation of species in this group, such as the size and pubescence of the plant, the form of the leaves, the color and markings of the corolla are extremely variable. Plants unquestionably of the same species from different localities, and even plants growing side by side, show great diversity in leaf outline and pubescence. The calyx and ovary present some good characters but the calyx appendages vary greatly in size and shape, being occasionally completely absent. The small flowered Nemophila (*N. pedunculata*, Benth. ?) growing on the San Francisco sand hills is often without calyx appendages and I have found *N. atomaria* with only one or two, the others not having developed. As Bentham first pointed out, the inter-staminal scales, or appendages, of the corolla are fairly constant in form in the same species. In the present grouping of the species the form of these scales has alone been considered of primary, and the vegetative characters of only secondary specific value. The corolla appendages are ten in number and occur in pairs at the base of each filament. Fischer and Meyer, in their

excellent paper on this genus, distinguish three kinds of corolla appendages: (*a*) scales with free tips; (*b*) scales adnate their whole length; and (*c*) hairy lines. Of the three species described in this paper, two have appendages of the first kind, with distinctly free tips. The other species has very narrow and very hairy scales and was probably included by Fischer and Meyer in the last class.

Either of the original descriptions of *Nemophila Menziesii* and of *N. insignis* would apply equally well to either of our two common large, blue Nemophilas. Hooker and Arnott who considered *N. insignis* a variety of *N. Menziesii* note no difference but the relative size of corolla and calyx. Now the form with reduced or abortive anthers has almost constantly flowers of about half the size of those of the perfect form. Is it not possible that Hooker and Arnott had these two forms before them when they united the species? However this may be, the descriptions proper are practically identical and can, therefore, be applied but to one plant. In a note Hooker and Arnott state that the leaves of *N. Menziesii* are exactly those of *N. parviflora*, which if constantly true, would exclude the name from use for either of the two plants to which it has been applied in recent works. It seems impossible to determine which plant received the name of *N. Menziesii* on account of the meagreness of the description. The type specimen is of little use, as Prof. Greene, who has lately seen it, states that it is without flowers and, therefore, impossible of determination. *N. insignis*, on the contrary, was figured in the Botanical Register in 1834, undoubtedly from the same plants from which Bentham drew up his description. From this there can be little doubt to which species this name was applied, though the form of the corolla scales is not very clearly brought out. A somewhat incomplete specimen of a large, blue-flowered Nemophila collected by Mr. Burtt Davy on Loma Prieta has leaves very closely resembling those of what seems to be the type of *N. parviflora*. The flowers are very hairy at the base of the corolla and apparently without scales.

This may be the original *N. Menziesii*, but more complete material would be necessary before hazarding an opinion. All that at present seems certain regarding the name *N. Menziesii* is that it was applied to some member of this group and that it was the first so applied. The original description covers very well the whole group and this taken in conjunction with the close resemblance of the different members seems to render it advisable to use the name *N. Menziesii*, H. & A., to designate the whole group and to consider the divisions of the group as sub-species. We can thus apply the names *N. insignis*, Dougl., and *N. atomaria*, F. &. M., to the plants which originally received those names. The common plant of the counties north of the Bay has never been properly segregated and is thus left without a name, a lack which I have supplied below.

N. intermedia. From 6 to 12 inches long, with ascending branches from the base, more or less hairy, leaves pinnately parted into 5 to 9 entire, or 2- to 5-lobed, divisions, petioles somewhat widened at the base and ciliate, the upper all opposite; corolla .75 to 1 inch wide, bright blue to white, distinctly blue-veined, more or less punctate with dull purple dots; inter-staminal scales extending nearly to the sinuses, long, narrow, hairy and with expanded tips; ovary rounded, ovules 12 to 24.

This plant is included with several others under the name of *N. Menziesii*, H. & A., by Gray in the Flora of North America, ii, 156; it is part of *N. insignis* as defined in the "Botany of the Bay Region." Living plants have been examined from the counties of San Francisco, Marin, Sonoma, Lake, Alameda and Contra Costa. The range of this plant is more northerly and westerly than that of *N. insignis* which prefers hot localities and especially sandy soils.

N. INSIGNIS, Dougl. In habit very like the above but less succulent and generally more hairy, leaves somewhat more divided; calyx with broader ovate-lanceolate divisions and shorter and broader appendages, shining and distinctly veined; corolla one inch or more broad or the imperfect

flowers half that size, from light to deep purplish blue, not distinctly blue-veined, the circular white center more or less punctate; inter-staminal scales short, wide and short hairy; ovary longer than in *N. intermedia* and with 20 to 32 ovules, Benth. Linn. Trans. XVII, 275, (1833) and Trans. Hort. Soc. I, 479; Gray, Flora of N. A. I, 155; Greene, Bot. Bay Region 252 in part. *N. Menziesii*, var., H. & A. Bot. Beech. 372.

Living plants of this species have been examined from the counties of San Francisco, Alameda (cultivated), Contra Costa, Amador, Tulare and Los Angeles.

N. ATOMARIA, F. & M. With the habit of *N. intermedia* but less hairy and growing only in springy places among the hills; corolla less than one inch wide, white with a slight tinge of violet on the outside of the tube, closely dark-spotted nearly to the edge, densely hairy within the tube; inter-staminal scales narrow and long-hairy; ovary rounded and less hairy than that of the two foregoing species, ovules about 16. Ind. Sem. Hort. Petrop. (1835). Bot. Reg. t. 1940

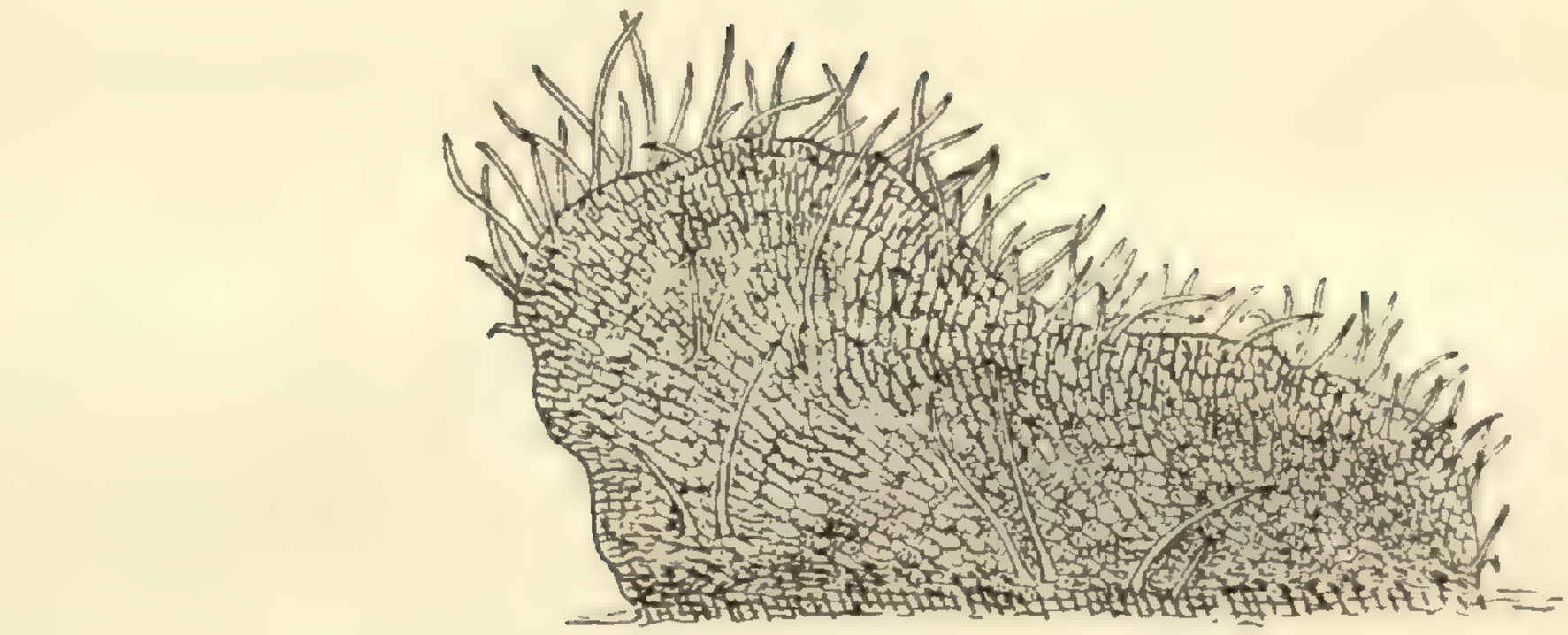
The figure of the scale is drawn from a plant from Cazadero, Sonoma Co.

The color of the flowers is variable in the first two species, but *N. insignis* is generally more deeply colored, of a less pure blue and with a white center of more distinct circular outline. The spots are very variable in both species. At Lake Merced, San Francisco and at Pomona the corolla of *N. insignis* is almost destitute of spots, while specimens of the same species from Tulare are more densely spotted than any specimens of *N. intermedia* that I have seen; but in neither species do the spots extend to near the edge of the corolla as in *N. atomaria.*

EXPLANATION OF PLATE.

I. Nemophila insignis, Douglas, corolla scale.
II. Nemophila intermedia, Bioletti, corolla scale.
III. Nemophila atomaria, F. & M., corolla scale.

Each of the figures is magnified twenty diameters.



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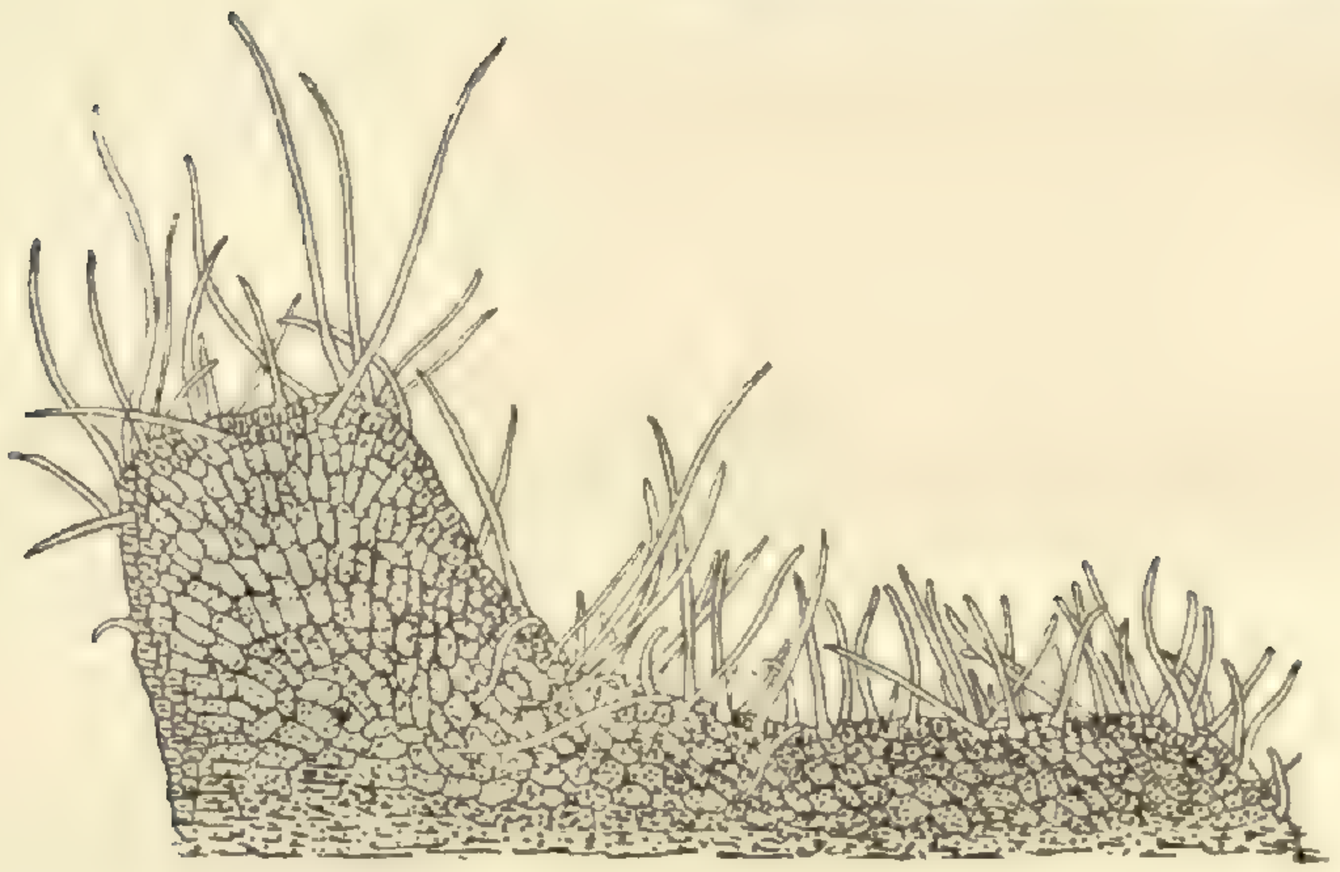

II

III

COROLLA SCALES OF NEMOPHILA.

PACIFIC SLOPE PLANTS IN ENGLISH GARDENS.

By J. Burtt Davy.

The Englishman's delight in his garden is proverbial. As with other things, this hobby of his is subject to the vicissitudes of fashion, both as regards the nature of the plants or the particular order or genus which receives his special attention, and as regards the method of laying out of the ground and the grouping of its occupants.

Within the last few years a re-action has been observed in English gardens against the stiffness and formality incident to "carpet-bedding" and "color-massing," and a desire has been manifest to produce as much diversity of form and coloring in a small space, as good effect would permit. This has resulted in the revival of the more natural and by no means new arrangements known as the "herbaceous-border," and the "rock-garden." The former is frequently met with in the form of a long flower-bed under a wall, or dividing a lawn or gravel walk from a live-hedge or shrubbery, having tall and showy herbaceous plants, such as Dahlias, Asters, Chrysanthemums, etc., for a background with shorter plants in front, and a border composed of *Lobelia Erinus* or some other dwarf species: the individual plants are relatively placed so that a succession of flowers is produced all through the season, no one part being entirely without blossoms or ornamental foliage at any time. The rock-garden is the result of an attempt to reproduce the conditions best adapted to the growth of Alpine plants and ferns, a bog-garden being often combined with the rockery.

In order to provide material for, and to maintain an interest in, these two forms of garden—usually met with in the same grounds—it is necessary for the nurseryman to go to more trouble and expense than he would to simply procure new forms, or variations in size and color, of one favorite species such as the ordinary garden Rose, the Pansy or the Chrysanthemum, for instance. He must provide "new garden plants," *i. e.* species which have never hitherto been

under cultivation or if once grown have since been lost to horticulture, in order to meet the demand for variety and novelty. For herbaceous-border work these plants should come from regions within the temperate zone, or if from the tropics then from comparatively high altitudes; his choice of locality is therefore restricted. Among countries affording the necessary qualifications California is one of the richest fields for the collector, the remarkable variations in climate, soil and altitude found within the borders of the State producing a very great variety in its flora. Earlier in the century, when Englishmen were willing to pay more for rare plants than now, and nurserymen were therefore able to send collectors to all parts of the habitable globe, California yielded no small proportion of the plants newly introduced to a flower-loving public. Latterly, little has been done in this line, but within the last year or two the interest in bulb culture and in the "mixed flower-border," has resulted in the introduction of several West-American novelties, mainly through the efforts of resident collectors. The bulb catalogue of a London (England) firm of nurserymen, lately issued, offers among other things the following Pacific-coast plants:—

Bloomeria aurea, Brodiæa coccinea, B. congesta, B. grandiflora, B. Hendersoni, B. Howellii and *B. volubilis, Calliprora flava, Calochortus amœnus, C. Kennedyi, C. luteus, C. Lyoni, C. pulchellus, C. splendens, C. venustus, C. v. citrinus, C. v. purpureus, C. v. roseus* and *C. v. Vesta, Camassia esculenta, C. Fraseri* and *C. Leichtlini, Erythronium giganteum, E. grandiflorum* and *E. Hendersoni, Fritillaria lanceolata* and *F. pudica, Milla laxa,* and *M. biflora.*

The prices at which these are offered in London are an interesting item: the following are some of the quotations:—

Brodiæa grandiflora 7/6 per 100 or 1/3 per doz.; *B. coccinea, Calochortus luteus,* and others 4/6 per doz. or 6d. each; *Calochortus amœnus, C. venustus Vesta, Camassia Fraseri, Erythronium Hartwegi,* and others 7/6 per doz.

or 9d. each; *Brodiæa Hendersoni*, *B. Howellii* and *B. volubilis* 1/ each; *Calochortus Lyoni* 1/6 each; *C. Kennedyi* 1/9 each; and *Camassia Leichtlini* 3/6 each.

The love of flower-culture has directly benefited the botanist in more than one way. To it, entirely, may be attributed the sending out of James Bowie, Allan Cunningham, David Douglas, and other collectors, on those expeditions which did so much to advance systematic botany. It has further resulted in the publication of plant-portraits such as those of the *Botanical Magazine*, *Botanical Register*, *Gardeners' Chronicle*, and *Gartenflora*, which have been of such service in the accurate delimitation of types. It will be of interest to West-American botanists to see that *Lilium Parryi* has recently been figured in the *Gardeners' Chronicle*, (Aug. 24th; 3 ser., xviii, 209) the drawing having been made from a specimen recently flowered, for the first time (?), under cultivation in England, and exhibited as a novelty at a meeting of the Royal Horticultural Society by Messrs. Wallace, Nurserymen, of Colchester. The figure is accompanied by the following extract from Dr. Parry's account of the plant as given by Elwes in his *Monograph of the genus Lilium* (1880):—

"In one of my last botanical excursions in the vicinity of San Bernardino in July, 1876, I accepted an oft-repeated invitation to visit the intelligent brothers J. F. and F. M. Ring in their mountain retreat near San Gorgonio Pass. Leaving the broad and picturesque basin of the Santa Ana Valley near the emergence of the stream from the rugged mountain-wall of the San Bernardino range, our route, after crossing Mill Creek, hugged the foothills bordering the Upper Yucaipa Valley; thence by a more rapid ascent in a nearly direct easterly course, we reached an elevated bench scattered with Pine and Oak groves, overlooking the broad sweep of the San Gorgonio Pass, now traversed by the eastern extension of the South Pacific Railroad. In one of these mountain nooks the Messrs. Ring have located a potato ranch, the elevation of over 4000 feet giving a sufficiently cool, moist

climate, while the adjoining mountain-slopes afford an extensive summer cattle-range long after the herbage of the lowlands has dried up.

In scattered groves of *Pinus Coulteri*, the ground was strewn with the massive cones of this peculiar species, its dense scales armed with formidable hooked spines. Many of the cones were fully 6 inches in diameter, with a length of 9 inches.

The few perennial watercourses here met with are mostly confined within deep and inaccessible ravines; but more frequently scanty springs ooze out from beneath deep layers of porous strata, and spread out into boggy marshes, generally choked up with rank Willow and Alder growths, and occasionally expand into small meadows of coarse grass and sedges.

On all the steep gravelly slopes adjoining, there was the usual display of Californian evergreen shrubbery, including the Heath-like *Adenostoma* (which under the name of 'chamisal,' is largely used for fuel), the Holly-leaved Cherry (*Prunus ilicifolia*) exhaling a strong odor of bitter almonds, the *Heteromeles arbutifolia*, with glossy varnished leaves, and a prevalent form of 'California Lilac' (*Ceanothus crassifolius*), with thick leathery foliage. The dull green hue which everywhere characterises the moorish growth, is at this time of the year partly relieved by brilliant scarlet festoons of *Pentstemon cordifolius* trailing over adjoining bushes, or the less showy blossoms of *P. ternatus*.

But what soon attracted more exclusive attention was a conspicuous yellow Lily growing abundantly on the boggy ground adjoining Messrs. Rings' house, and sharing with the potato-patch the care and attention of the undisputed possessors of the soil. Though not so showy as some other members of the Lily family in this region, there is a grace displayed in its large drooping flowers, surmounting a slender stem beset with narrow scattered leaves, which are occasionally crowded at the base into a distinct whorl."

There remain many remarkable and handsome novelties indigenous to the Pacific Slope, which would greatly enrich the herbaceous-border, rock-garden or temperate-house of European lovers of plants, and which only await the foresight and capital of enterprising nurserymen to be made available. Travelling is still very expensive in this region (3 cents a mile and upwards, by railroad) and the area included in the coast States very great, much greater evidently, than Europeans and even dwellers in the eastern States realize; nevertheless the rapid increase of population and consequent increase in facilities for travel renders the work of exploration, collection and transport comparatively easy, and far less costly than in many other countries, especially if resident collectors, well acquainted with western life, are employed. While annuals form a large proportion of the showy spring flowers of the coast plains, there is also a rich abundance of perennial species.

OPEN LETTERS.

The following letter is in answer to an inquiry respecting the folk-name "gietta grass" and the identification of the plant to which it is applied.

SAN BERNARDINO, CALIFORNIA, Sept. 15, 1895.

Your favor inquiring about the desert grass called *gietta grass* is received. The name as given in *Bot. Calif.* (ii. 293) is *Pleuraphis rigida,* but later it has been named by Haeckel *Hilaria rigida.* It is true desert grass, never growing elsewhere. It is excellent fodder, not only "mules" but horses and cattle preferring it to any other wild or cultivated plant, I believe. It is the grass often spoken of by desert men as being "cut with a hoe," as it is so woody (apparently) and brittle that a hoe is the ordinary tool used in gathering it. Teams coming in from the desert often have

a bundle of it on their wagon, as a precautionary provision for the animals. The orthography of the word, [gietta], is various; I judge it to be an Indian word, a true "native word" as well as being a native plant; it is sounded as if spelled gy-i-ett′-a, almost in four syllables,—(g = hard, i = short e), though the i is very short and slurred over, approaching gy-ett′a.

The only other desert grass of eminent value for forage is the "grama grass", *Bouteloua* spp. of *Bot. Calif.*, which grows in similar places,—both grasses growing abundantly in their own chosen localities, but always thoroughly desert.

It has been some years since I have collected many desert plants and I am not certain whether I have any specimens or not, of either, as my plants are boxed and stored; but if you need any, I can probably get them, perhaps from Mr.— , if not from my boxes.

Yours truly,

W. G. Wright.

Miss Alice Eastwood,
California Academy of Sciences.

MISCELLANEOUS NOTES AND NEWS.

The vacancy in the professorship of botany in the University of California has been filled by the election thereto of Dr. W. A. Setchell, Instructor in Botany in the Sheffield Scientific School, Yale University. He graduated from Yale in 1887 where he was a student of Eaton and continued his work as a graduate student under Dr. Farlow at Harvard where he received his doctor's degree in 1891. Professor Setchell is largely interested in the marine algae. As a result of his work in this field he has contributed to the Proceedings of the American Academy of Arts and Sciences two articles: "Concerning the Structure and Development of Tuomeya fluviatilis, Harv." (xxv., 53, May, 1890) and "Concerning the Life-History of Saccorhiza dermatodea,

(De la Pyl.) J. Ag." (xxvi, 177, September, 1891). These articles were accompanied by plates illustrating gross and minute structure. A paper entitled "On the Classification and Geographical Distribution of the Laminariaceae," may be found in the Transactions of the Connecticut Academy, (ix., 333, 1893). These papers will give an idea of the character and purpose of the research work of the new head of the Department of Botany at California. We believe they represent thus far the totality of his published contributions to the knowledge of the marine algae. In the Botanical Gazette for May, 1894, appeared "Notes on the Ustilagineae." Professor Setchell there describes a new species of Doassansia, viz. *D. intermedia* and, also, describes and figures the germination of several other species. One of his latest papers is a biographical sketch of Professor Eaton. This was published in the Bulletin of the Torrey Club for August, 1895. The summer botanical work at Woods Holl, it may be noted, is under his direction. It is hardly necessary to say that Professor Setchell is versed in modern laboratory methods. He has the reputation of being a careful and thorough worker and possesses the very large advantage of being a young man.

Dr Maxwell T. Masters, has renamed the Guadeloupe Island Cypress as *Cupressus macrocarpa* var. *guadeloupensis*, in the *Gardeners' Chronicle* for July 20 (3 ser., xviii. 62). In connection with this change he remarks:—"The late Prof. Sereno Watson described, (Proc. Am. Acad. xiv. 300, 1879), this fine Cypress as a distinct species, under the name of *C. guadeloupensis*, and perhaps rightly. It may also, and, as we think, more correctly, be considered as a form of *C. macrocarpa*. The latter, known as the Monterey Cypress, has a very limited range of distribution on the Californian coast, and, to our thinking, the present is but an insular variety of the species, differing from the type more especially in its glaucous color. It is true there is a considerable distance between Monterey in lat. 36° 4′, and

Guadeloupe, an island in 29° N. L., 200 miles from the ma n-land, with deep sea all around, but it is possible that inter-mediate localities may be found. At any rate, the presence of distinct characters is a common feature of plants growing on isolated islands, * * *."

In his *Handbook of West-American Cone Bearers*, (July, 1895) Mr. Lemmon gives as an additional locality for this tree, "Coast of San Diego County, California."

Dr. Masters' article is accompanied by a figure of *Cup-ressus macrocarpa* var. *guadeloupensis* with foliage and male flowers magnified, cones rather reduced, and, for sake of comparison, a figure of *C. Arizonica*, Greene, with a transverse section of the leaves of that species, and also of those of *C. macrocarpa*, Hartweg. J. B. D.

THE SUM of $250,000 has been subscibed for the proposed New York Botanic Garden. A number of wealthy citizens have each subscribed $25,000 and others lesser amounts. The sum so obtained, and as much more as can be secured, is designed solely for an endowment. The city of New York is expected to provide two hundred and fifty acres of land and a half-million dollars for buildings. The plans of this bot-anical establishment as outlined contemplates that pro-vision will be made for nearly all lines of botanical work. The success of the undertaking thus far is largely due to Dr. N. L. Britton.

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EDITED BY

WILLIS LINN JEPSON

AND OTHERS, OF THE DEPARTMENT OF BOTANY,

UNIVERSITY OF CALIFORNIA.

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OBSERVATIONS ON THE HABITS OF NEMOPHILA.

By Alice Eastwood.

The Nemophilæ comprised provisionally under the name of *Nemophila Menziesii* in a previous article[1] are undoubtedly adapted for pollination through the agency of insects. The lines and dots of the petals, the honey glands and protective hairs, and, above all, the arrangement of the essential organs indicate it plainly. In *Nemophila insignis* and *intermedia* (?) there are two distinct kinds of plants, those with pistillate flowers only and those whose flowers are all hermaphrodite. This may also be the case in *N. atomaria;* but so far all plants seen have only hermaphrodite flowers.

The hermaphrodite flowers of the group are proterandrous. Soon after the flower expands the stamens begin to discharge their pollen; the stigmas are immature and non-receptive and the two branches of the style are almost side by side as shown in figures A and C, the papillae on the surface of the stigma being undeveloped though perceptible. The stamens are extrorse and discharge the pollen among the hairs of the corolla appendages and of the ovary. The honey glands are quite large and are protected by the surrounding hairs.

As the anthers grow old, shrivel and lose their pollen, the branches of the style begin to spread apart and grow longer, even curving downwards as if to reach the insects seeking the honey below at the base of the ovary; the stigmas become bulbous and the papillae which were smooth and round develope almost into tubercles. Figures C and D show the difference between the mature and immature stigmas.

In the pistillate flower (fig. B) the opening corolla shows quite a different condition. The stamens are, of course, sterile, mere ghosts of stamens with the outlines of filaments and anthers but without that which gives the anthers life. The pistil, however, is conspicuous, the branches of the style fully

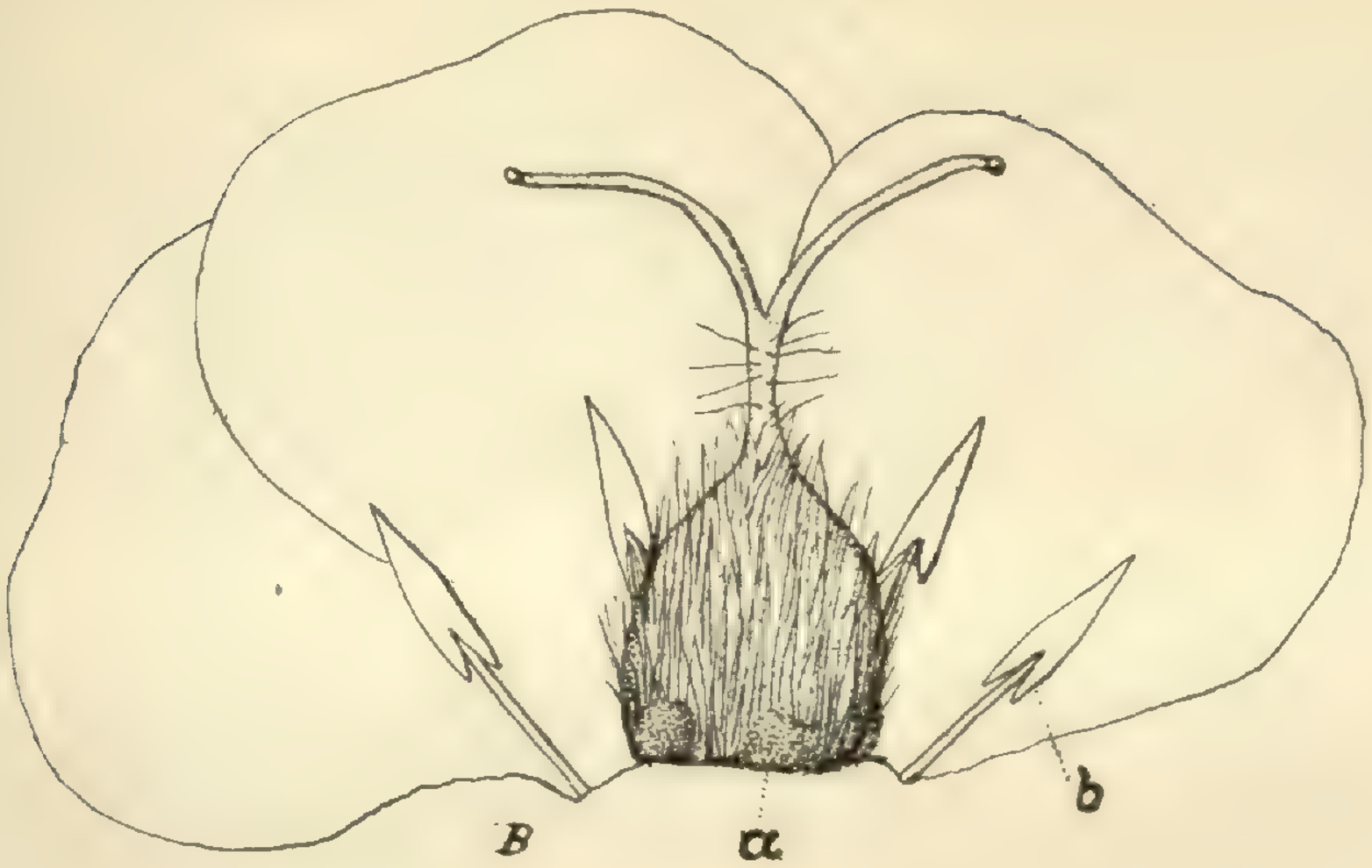
[1] Supra p. 139.

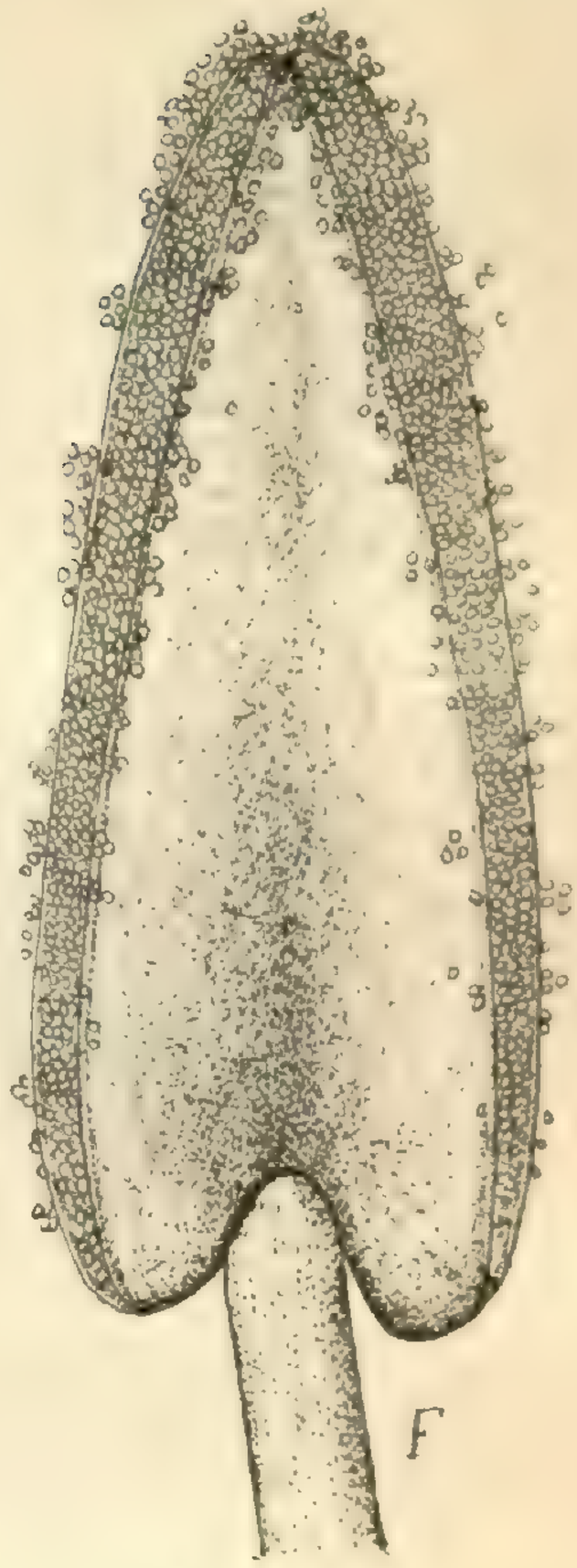
expanded and the stigmas receptive from the first. Figs. E and F show the relative size of the fertile and sterile anthers. The honey glands of the pistillate flowers are somewhat larger than those of the hermaphrodite flowers and the corollas are usually smaller. Wherever a patch of *Nemophila insignis* is seen the female plants can be easily distinguished by a more robust habit of growth and smaller deep blue flowers. The plants with perfect flowers are more abundant and with their more showy corollas almost banish their specialized companions into obscurity.

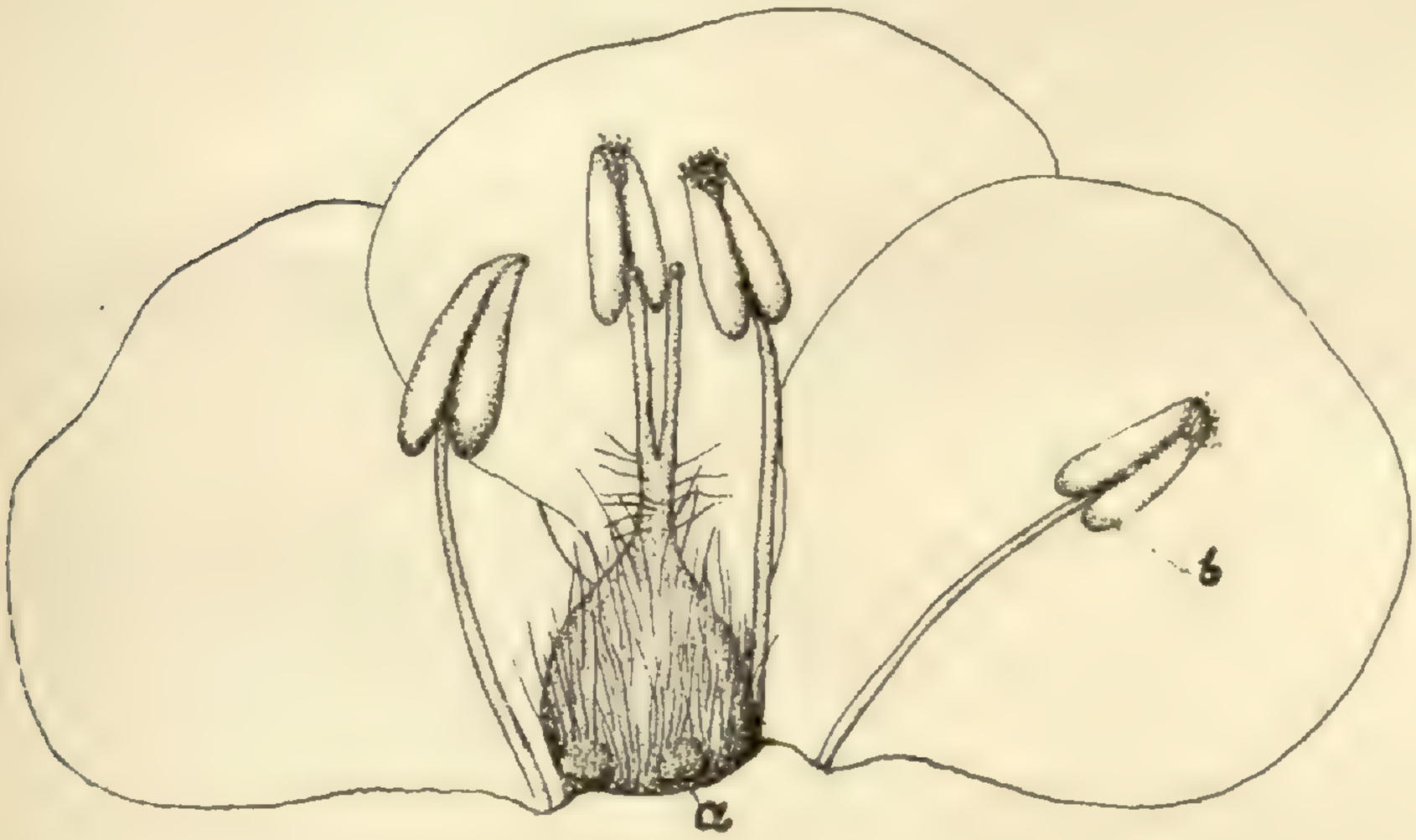
An investigation of many plants of *Nemophila insignis* collected when the first fruits were ripe and flowers still present did not show, as expected, that the fruits of the pistillate flowers contained more or larger seeds or indeed any structural superiority. If there is any, the evidence is in favor of the hermaphrodite flowers. An unlooked-for, but easily explained difference, however, became evident. It was found that the pistillate flowers ripened fruit earlier.

The reason of this will be understood when it is remembered that the pistillate flowers have receptive stigmas from the first and so get the start of the hermaphrodite flowers. This habit of the plant may have arisen from the necessity for ripening the fruit before the dry season. Nemophila is one of the earliest annuals and without qualities for resisting drought. It comes up early in the spring, flourishes awhile in great profusion and, except in some favored spots, is entirely gone before the hills turn brown.

The following table shows the results of the examination of the fruits. Besides the hermaphrodite flowers in the table, a great many were examined that had fruit too young to be sure of the number of seeds. Of these I kept no account. Very few plants with pistillate flowers were found that had not some pods with well formed seeds. Each group of figures enclosed in parentheses represents the number of seeds found in the almost ripe capsules of a single plant, each figure representing a single capsule.







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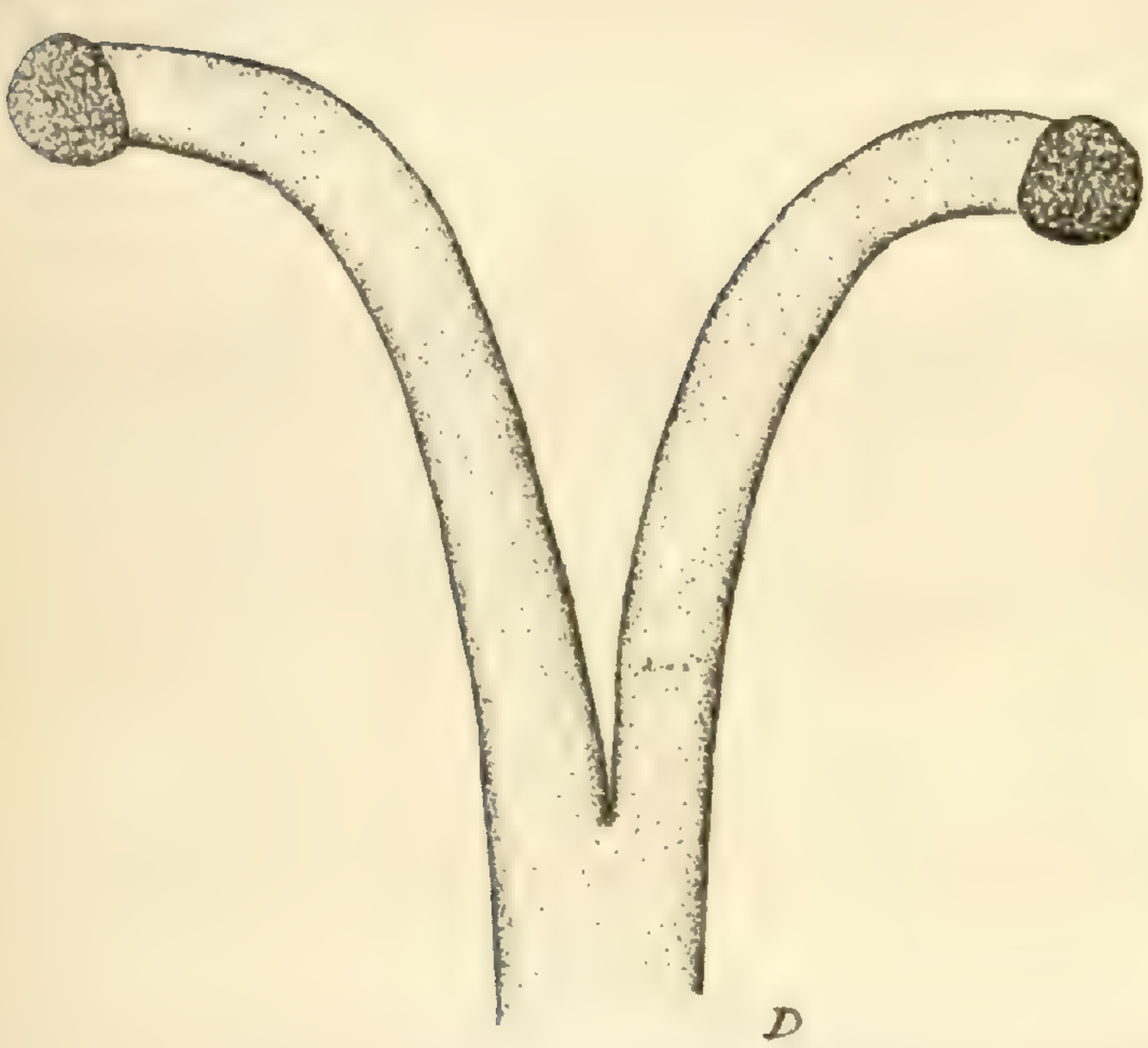

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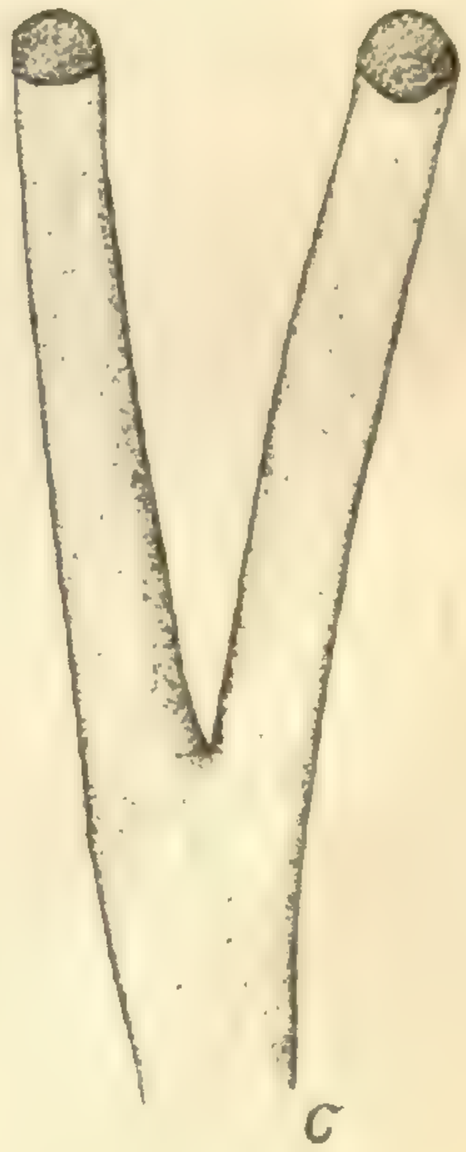

C

NEMOPHILA INSIGNIS, Dougl.

PLANTS WITH HERMAPHRODITE FLOWERS.

(14, 8) (16) (12, 13, 8, 9, 10) (9, 11, 15) (20, 18, 18, 16, 19) (14, 6, 8, 6) (16, 12) (20, 23, 26) (18, 19) (14, 25, 19, 23, 14) (18, 17) (8) (7) (6)

PLANTS WITH PISTILLATE FLOWERS.

(13, 14) (10, 9, 6, 10) (19, 16, 13, 22) (14, I3, 21, 16) (8, 7, 11) (3, 4) (8, 6, 5, 6, 3) (7, 9, 9) (9) (7, 9, 8) (3) (10, 6) (13, 5, 9, 11, 12) (13, 8, 10) (15, 16) (22, 20, 19, 17, 16, 17) (14, 18, 20)

These tables are interesting as showing the variable number of seeds ripening, and also that the two kinds of plants are equally variable in this respect.

EXPLANATION OF PLATE.

A. Perfect flower; *a*, honey gland; *b*, anther discharging pollen.

B. Pistillate flower; *a*, honey gland; *b*, anther discharging pollen.

C. Immature stigma.

D. Receptive stigma.

E. Sterile stamen.

F. Fertile anther.

BOTANICAL EXCURSION TO ANTELOPE VALLEY.

By Dr. A. Davidson.

On the first day of May my companion and I arrived at Lancaster, Los Angeles Co., on a botanical excursion, and early the following morning took our seats in the mail stage for Gorman Station, fifty miles westwards. The district traversed, commonly known as the Antelope Valley, is practically an immense, level, triangular plain bounded by the Tehachapai Mountains on the north and the Sierra

Madre on the south, and at the point of junction is Gorman, a few miles on this side of the summit of the pass that lies within thirty miles of Bakersfield. The soil immediately surrounding Lancaster, and for twenty miles west thereof, is little cultivated, but beyond that point the valley, in almost its whole extent, may be considered as land fertile and fruitful.

About midway on this journey is the Colony of Manzana where about three thousand acres of the land bordering the southern foothills is occupied by neatly cultivated and thriving orchards of almond trees. The remainder of the valley where cultivated is sown with wheat. This year, doubtless owing to the opportune rains of winter, the wild plants all over this section have not only been more abundant than I have ever seen them but the colored species are of a deeper, richer tint. The mind may picture, to some extent, perhaps, the gorgeous effects produced by the acres on acres of wheat fields and hillsides aglow with Eschscholtzias, their petals of burnished gold and crimson reflecting the rays of the noon-day sun, while here and there large and deep blue patches of *Salvia carduacea* and the purple of *Orthocarpus purpurascens* amidst the golden Eschscholtzia heightens the beauty of the scene. *Amsinckia spectabilis*, F. & M., known here by the rather appropriate name of "Woolly Breeches," is very abundant, and in the uncultivated or neglected fields it seems for a season or two, with *Tropidocarpum scabriusculum*, Hook., to monopolize the soil.

As we continued our journey, the valley gradually narrowed until the terminus was reached at Gorman, where it is but a narrow pass. There we arrived at six o'clock and made our quarters in the old hostelry. The next morning the stiff breeze of the day before had increased to a gale, so we turned our faces to the southern hills, and explored the sheltered valleys on that side.

As the object of this paper is to list the various plants of this district that are mostly unrecorded for the county, I shall omit all reference to the commoner species. The first

plant gathered, and of which we had seen specimens on the way, was *Collinsia Davidsonii*, Parish. It seems to be abundant all along the foothills from Lancaster. The type specimens from the latter place possessed a smooth calyx, while some of those here, and near Manzana, were more or less hirsute, nevertheless, it proves to be a good species. The beautifully colored *Astragalus Purshii*, Dougl., was abundant, growing with *Senecio multilobatus*, T. & G.; the latter, common enough on the coast hills at an altitude of four thousand feet, I have not found further east on this range, although it extends inland on the northern mountains as far as Tehachapai. A few plants, the only ones seen, of *Balsamorrhiza deltoidea*, Nutt., were noticed among the scrub oak, and *Ribes leptanthum*, Gray, *Phacelia ciliata*, Benth., *Streptanthus acutirostris*, and *Galium Andrewsii*, Gray, were all in flower. In a sheltered nook my first specimen of *Bromus carinatus*, Hook., was gathered, and on the margin of the marsh, near the station, appeared *Microseris montana*, Greene, and a variety of *Vicia Americana* with hirsute leaves.

In the afternoon we climbed the steep slopes of the hills on the northern side of the pass, which, on account of the trespassing sheep, were nearly devoid of underbrush but copiously covered with *Lupinus formosus*, var. *Bridgesii*, Greene, *L. Chamissonis*, Esch., var. *longifolius*, Wats., *L. micranthus*, Dougl., *Layia heterotricha*, H. & A., *Gilia tenuiflora*, Benth., and, more sparingly, *G. inconspicua*, Dougl., var. *sinuata*, Gray. In the shade of some live oaks *Ellisia membranacea*, Benth., was abundant. On the rocky ground grew *Streptanthus heterophyllus*, Nutt., *Œnothera gauræflora*, T. & G., and a few plants of *Astragalus Antiselli*, Gray.

On the next day we took the stage back to Manzana, collecting on the way *Madia elegans*, Don, *Troximon heterophyllum*, Greene, *Malacothrix Coulteri*, Gray, and *Mirabilis multiflora*, Gray, var. *pubescens*, Wats., the last not yet in flower. For the next three days we made Manzana our headquarters in order to explore the hilly district adjoining.

About three miles from Manzana is a small sheet of water, Lake Catrina, the road to which is well defined and botanically very interesting. As we entered the foothills the first shrub encountered was the wild almond, *Prunus fasciculata*, Gray. *Gilia Parryæ*, Gray, and *G. dichotoma*, Benth., are here abundant. Throughout the day the latter can scarcely be observed, its convoluted tube being tightly closed, is inconspicuous; but at five in the afternoon all is changed. The plants of *Gilia Parryæ*, that all day sparkled like daisies in the sun, have closed, and in the space of ten or fifteen minutes, *Gilia dichotoma* has unrolled its petals and filled the air with sweet fragrance. With the appearance of the morning sun *Gilia dichotoma* goes to sleep again, and *Gilia Parryæ* opens. A few specimens of *Collinsia Childsii*, Parry, gathered here had such congested branches as to appear new to me, but Dr. Robinson of Harvard, who examined them, informs me that the same form was gathered by the Death Valley explorers. *Peucedanum dasycarpum*, T. & G., and *P. Parishii*, C. & R., were plentiful and in the shade of the pine trees, further on, *Leptotænia multifida*, Nutt., was coming into flower. *Chænactis Fremonti*, Gray, *C. stevioides*, H. & A., *C. Xantiana*, Gray (the two latter rare), with *Viola præmorsa*, Dougl., and *Arabis pulchra*, M. Jones, were here observed.

On the heights near the shore of the lake *Thermopsis Californica*, Wats., was growing, while around the water were a number of willows which presented a curious appearance on account of the long rootlets hanging from their branches six feet up, the result of a long continued overflow of water about six years ago.

Entering a cañon south of this, and passing over a high ridge into King's .Cañon, gave us an opportunity of seeing some new shrubs. In the bottom of the watercourses and in King's Cañon a few trees of *Æsculus Californica*, Nutt., were found; doubtless they are to be found in all the moist cañons of the range. The pine trees here (alt. 3,500 ft.) are all *Pinus Sabiniana*, Dougl., while farther westwards *P.*

monophylla, Torr. & Frem., is more common at this altitude. The younger trees, with their large lateral and persistent cones, and long leaves, look quite handsome, but the older ones with gnarled and twisted trunks are unsymmetrical and ragged. A few trees of *Forestiera Neo-Mexicana*, Gray, occupying a shady slope, and *Ceanothus vestitus*, Greene, and *C. divaricatus*, Nutt., the only representatives of this family, were noted. Some of the hillsides, devoid of brush and almost wholly covered with *Lupinus Chamissonis*, var. *longifolius*, Wats., presented quite a gorgeous appearance. On the richer banks along the path, *Syntrichopappus Lemmoni*, Gray, *Troximon retrorsum*, Gray, *Microseris linearifolia*, Gray, with glandular peduncules, *Lotus leucophyllus*, Greene, and *Eulophus Pringlei*, C. & R., were in flower. At the head of King's Cañon, *Claytonia spathulata*, Dougl., and *Pentstemon ternatus*, Torr., grew rather sparingly.

Around Lancaster the majority of the spring plants were in bloom and the following less common species were observed and deemed worthy of record:

Gilia tricolor, Benth.
G. Matthewsi, Gray.
G. floccosa, Gray.
G. latiflora, Gray.
G. inconspicua, Dougl.
Malacothrix glabrata, Gray.
M. sonchoides, T. & G.
Glyptopleura setulosa, Gray.
Anisocoma acaule, T. & G.
Rafinesquia Neo-Mexicana, Gray.
Aplopappus interior, Coville
Streptanthus inflatus, Greene
Lepidium Fremonti, Wats.
Delphinium recurvatum, Greene.
Canbya candida, Parry.
Astragalus dispermus, Gray
Astragalus acutirostris, Wats.
Lupinus Shockleyi, Wats.
Œnothera gauræflora, T. & G.
Œ. Palmeri, Wats.
Œ. caespitosa, Nutt.
Œ. brevipes, Gray.
Œ. dentata, Cavanilles, var. *grandiflora*, Wats.
Coldenia brevicalyx, Wats.
Pectocarya setosa, Gray.
Phacelia bicolor, Torr.
P. Mohavensis, Gray.
Nama pusillum, Lemmon.
Malva exile, Gray.
Sphæralcea ambigua, Gray.
Lycium Cooperi, Gray.

Castilleia plagiotoma, Gray.
C. affinis, H. & A.
Eriogonum delicatulum, Wats.
E. crenulatum, Parry.
E. angulosum, Benth.
Chorizanthe brevicornu, Torr.
Oxytheca luteola, Parry.
Calochortus flexuosus, Wats.
C. Kennedyi, Porter.
Salsola Kali, L.

The last, the Russian Thistle, is a recent importation, having been first observed two years ago, though, from the number of plants then existing, it had probably been introduced two years prior to that. Be this as it may, there is no doubt of its existence now over a considerable area of the desert lands. It grows freely in the streets of Lancaster, or in any ground where the surface is occasionally disturbed and is thus more likely to prove a pest in cultivated fields than in orchards or in open ground. I observed it near Del Sur, ten miles west of Lancaster, where it was probably carried by the wheels of passing teams, and it requires but a season or two more of neglect to be thus carried over all the roads in the valley. Ten miles to the south-west it is also established, and the local authorities, by way of exterminating the pest, have destroyed all the old and already fruited plants, and have left those of this season's growth to mature at will.

NOMENCLATURE AT THE SPRINGFIELD MEETING OF THE A. A. A. S.

By Charles Louis Pollard.

The meeting of the American Association for the Advancement of Science, held recently at Springfield, though less fully attended than usual, was certainly a success from a social and scientific point of view. So far as attendance is concerned, it is open to question whether the gatherings of

various affiliated societies, held before and during the meetings of the Association, do not tend to diminish interest in the latter. A committee has been appointed to consider this point and to report at the Buffalo meeting next year. A very praiseworthy change has also been made in the date of assembling, and henceforth the general sessions will commence on Monday instead of Thursday as heretofore, allowing four days for the reading of papers, and Saturday for those who wish to take the excursions offered.

Undoubtedly the chief interest of many of the botanists present centered in the proceedings of the Botanical Club. It was known that the Nomenclature Committee appointed at Rochester three years ago would render a report at this meeting, and in view of the public discussion which the subject of botanical nomenclature has evoked during recent years, the report and action thereon were expected with interest.

The Club was organized on Thursday by the election of Judge David F. Day as temporary Chairman, and H. C. Bolley as Secretary. On the following morning, when the Club was called to order, Dr. Britton reported for the Committee that the Check List of North-eastern North American Plants had been completed in accordance with instructions, and without expense to the Club. In view of the importance of the subject, action was deferred until a special meeting of the Club at four o'clock on Friday, called for the purpose of discussing the report. On Friday afternoon, accordingly, a large number of botanists and others interested assembled. The chair was occupied by the President, Professor Douglas H. Campbell, who had arrived during the day. The gathering probably represented all phases of opinion, and nearly all sections of the country.

The motion to accept the committee's report, which had been made at the morning session, was first taken up, and after some discussion as to the effect of its adoption, was carried unanimously. Dr. B. L. Robinson then offered some criticisms on the results of the committee's work, directed chiefly against such corrections of spelling as *Koniga* for

the original *Konig*, and contended that the strict application of the law of priority should exclude all alterations of generic names. In reply it was admitted that the work of the committee was not altogether free from mistakes, but that in the judgment of a majority of the members, typographical or other obvious errors in orthography (as *Scoria* for *Hicoria*) should be corrected. A mistaken impression has prevailed in some quarters that the Check List is to be regarded as infallible; it is, however, merely an illustration of the practical application of a stable and systematic code of nomenclature, requiring much careful revision and the labor of numerous specialists to bring it to the highest degree of utility. Mr. M. A. Carleton urged that no further steps be taken until an international congress could be brought to consider the whole subject of botanical nomenclature. It was observed, however, that the first attempt to bring order out of chaos in the matter of plant names originated in France only, and that British botanists were as reluctant then as now to participate in any movement of reform. In this connection Professor Britton's notes on the last edition of the London Catalogue of British Plants, given before Section G on Friday morning, are of great interest. In this Catalogue a number of older generic names have been adopted, most of which are identical with those accepted by the authors of the Check List; thus, *Castalia* replaces *Nymphaea*, *Nymphaea* supplants *Nuphar*, *Senebiera* becomes *Coronopus*, and so on. There are thus only 18 different generic names, with about 440 in common. In view of the fact that Engler and Prantl, in "Die Naturlichen Pflanzenfamilien" adopt in most cases these same names, the circumstance affords a striking object lesson to those who would have us believe that the movement in favor of the law of priority is local in both scope and origin.

Discussion at the meeting was terminated by the introduction of a resolution by Dr. Britton as follows:

Resolved: That in view of the opinions expressed both at home and abroad, the matter be referred to the Committee

for discussion, and report next year, and that the Committee be increased by the addition of Professor C. S. Sargent and Dr. B. L. Robinson.

Upon the refusal of the latter to serve, Professor L. H. Bailey was elected as a member of the Committee. The meeting then adjourned until Monday morning, when the following officers were chosen for 1896: President, Mr. Frederick V. Coville; Vice-President, Professor Conway MacMillan; Secretary and Treasurer, Mr. J. F. Cowell.

The subject of botanical nomenclature then, so far as further or supplementary action by the Botanical Club is concerned, is deferred, and the principles adopted at Rochester and Madison remain unchanged. The fact that in spite of the large attendance of conservative botanists the main principles of the code were not once attacked, proves conclusively, it would seem, that its ultimate acceptance has become assured. The constantly multiplying disadvantages of a system under which it is possible to assign a dozen different names to the same plant cannot fail to impress the great majority of botanical workers in all countries.

MISCELLANEOUS NOTES AND NEWS.

THE FIRST fascicle of Vol. i, Part I, of the Synoptical Flora of North America is announced as ready. This is the first portion of the work to appear since the death of Gray, the preparation of the manuscript having been carried on by Dr. B. L. Robinson. The original plan has been followed and the treatment of the Polypetalous orders will form when completed, Vol. i, Part I. The first fascicle includes seventeen orders, Ranunculaceæ, Cruciferæ, Violaceæ, etc. In the preparation of the manuscript for the second fascicle, which is to appear at an early date, Dr. Robinson will be assisted by Professors Coulter, Trelease and Bailey.

THE fourth and last part of the Index Kewensis has been issued.

KERNER and OLIVER'S Natural History of Plants is now completed.

J. G. LEMMON, familiar as a field student of western pines and firs, published in July, 1895, a small volume which he calls "Handbook of West-American Cone-Bearers." Besides the systematic arrangement of the species the author comments on the aspect of the pines and the impression made upon the beholder. The Handbook will undoubtedly be of good service to those who desire an easy guide to the scientific and common names of our coniferae. There are a number of illustrations of fruiting branches.

AN annotated list entitled "Flora of Pasadena and Vicinity," of which Professor A. J. McClatchie of the Throop Polytechnic Institute is the author, has been sent to us in the form of a reprint from a local history. The list is unique among local catalogues hitherto published in California in that plants of all orders of the vegetable kingdom are included—not excepting the most simple forms. Typographical errors are rather frequent. The author, who has worked zealously on the vegetation of his region, was not given opportunity, we judge, to make corrections.

IT IS announced that Mr. B. Daydon Jackson, Secretary of the Linnean Society, so well-known as the compiler of the "Guide to the Literature of Botany and Vegetable Technology," but especially of the "Index Kewensis," will shortly devote his energies to the publication of a new edition of Pritzel's famous "Thesaurus Literaturae Botanicae."

C. G. LLOYD of Cincinnati, Ohio, distributed early in the year a set of three photographs of American fungi. These photographs are very creditable productions showing well the characteristic features of the plants. Another set (Nos. 4-7) has lately been issued by a photo-gravure process. It is now proposed to reissue as photo-gravures the first three plates distributed and eventually furnish text with each plate and an index to the whole when completed.

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PRESIDENTIAL ADDRESS TO THE BOTANICAL SECTION OF THE BRITISH ASSOCIATION.[1]

By W. T. Thiselton-Dyer, M. A., F. R. S.
Director of the Royal Gardens, Kew.

The establishment of a new Section of the British Association, devoted to Botany, cannot but be regarded by the botanists of this country as an event of the greatest importance.

I confess I found it a great temptation to review, however imperfectly, the history and fortunes of our subject while it belonged to Section D. [Biology]. But to have done so would have been practically to have written the history of botany in this country since the first third of the century. Yet I cannot pass over some few striking events.

I think that the earliest of these must undoubtedly be regarded as the most epoch-making. I mean the formal publication by the Linnean Society, in 1833, of the first description of 'the nucleus of the cell,' by Robert Brown.[2] It seems difficult to realize that this may be within the recollection of some who are now living amongst us. It is, however, of peculiar interest to me that the first person who actually distinguished this all-important body and indicated it in a figure, was Francis Bauer, thirty years earlier, in 1802. This remarkable man, whose skill in applying the resources of art to the illustration of plant anatomy has never, I suppose, been surpassed, was resident draughtsman for fifty years to the Royal Botanic Garden at Kew. And it was at Kew, and in a tropical orchid, *Phaius grandifolius*, no doubt grown there, that the discovery was made.

It was, I confess, with no little admiration that, on refreshing my memory by a reference to Robert Brown's paper, I

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1 Delivered at the inauguration of Section K, (Botany) of the British Association for the Advancement of Science, at Ipswich, September 12, 1895, and reprinted by kind permission of the author. A few paragraphs of less general interest have been omitted through lack of space.

2 *Misc. Bot. Works*, i. 512.

read again the vivid account which he gives in a footnote of the phenomena, so painfully familiar to many of us who have been teachers, exhibited in the staminal hair of *Tradescantia*. Sir Joseph Hooker [3] has well remarked that 'the supreme importance of this observation,....leading to undreamt-of conceptions of the fundamental phenomena of organic life, is acknowledged by all investigators.' It is singular that so profound an observer as Robert Brown should have himself missed the significance of what he saw. The world had to wait for the discovery of protoplasm by Von Mohl till 1846, and till 1850 for its identification with the sarcode of zoologists by Cohn, who is still, I am happy to say, living and at work, and to whom last year the Linnean Society did itself the honor of presenting its medal.

The Edinburgh meeting of the Association, in 1834, was the occasion of the announcement of another memorable discovery of Robert Brown's. I will content myself with quoting Hofmeister's [4] account of it. 'Robert Brown was the discoverer of the polyembryony of the *Coniferæ*. In a later treatise he pointed out the origin of the pro-embryo in large cells of the endosperm, to which he gave the name of corpuscula.' The period of the forties, just half a century ago, looks in the retrospect as one of almost dazzling discovery. To say nothing of the formal appearance of protoplasm on the scene, the foundations were being laid in all directions, of our modern botanical morphology. Yet its contemporaries viewed it with a very philosophical calm. Thwaites, who regarded Carpenter as his master, described at the Oxford meeting in 1847 the conjugation of the *Diatomaceæ*, and 'distinctly indicated,' as Carpenter [5] says, 'that conjugation is the primitive phase of sexual reproduction.' Berkeley informed me that the announcement fell perfectly flat. A year or two later, Suminski came to London with his splendid discovery (1848) of the archegonia of the

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[3] *Proc. Linn. Soc.*, 1887–88, 65.

[4] *Higher Cryptogamia*, 432.

[5] *Memorial Sketch*, 140.

fern, the antheridia having been first seen by Nägeli in 1844. Carpenter [6] gave me, many years after, a curious account of its reception. 'At the Council of the Ray Society, at which,' he said, 'I advocated the reproduction of Suminski's book on the "Ferns," I was assured that the close resemblance of the antherozoids to spermatozoa was quite sufficient proof that they could have nothing to do with vegetable reproduction. 'I do not think,' he added—and the complaint is pathetic—'that the men of the present generation, who have been brought up in the *light*, quite apprehend (in this as in other matters) the utter darkness in which we were then groping, or fully recognise the deserts of those who helped them to what they now enjoy.' This was in 1875, and I suppose is not likely to be less true now.

The Oxford Meeting in 1860 was the scene of the memorable debate on the origin of species, at which it is interesting to remember that Henslow presided. On that occasion Section D. reached its meridian. The battle was Homeric. However little to the taste of its author, the launching of his great theory was, at any rate, dignified with a not inconsiderable explosion. It may be that it is not given to the men of our day to ruffle the dull level of public placidity with disturbing and far-reaching ideas. But if it were, I doubt whether we have, or need now, the fierce energy which inspired then either the attack or the defence. When we met again in Oxford last year the champion of the old conflict stood in the place of honor, acclaimed of all men, a beautiful and venerable figure. We did not know then that that was to be his farewell.

The battle was not in vain. Six years afterwards, at Nottingham, Sir Joseph Hooker delivered his classical lecture on Insular Floras. It implicitly accepted the new doctrine, and applied it with admirable effect to a field which had long waited for an illuminating principle. The lecture itself has since remained one of the corner-stones of that

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6 *Memorial Sketch*, 141.

rational theory of the geographical distribution of plants which may, I think, be claimed fairly as of purely English origin.

Henslow.

There is one name written in the annals of our old Section which I cannot pass over—that of Henslow. I suppose there are few men of this century who have indirectly more influenced the current of human thought. For in a great measure I think it will not be contested that we owe Darwin to him. As Romanes has told us:[7] 'His letters written to Professor Henslow during his voyage round the world overflow with feelings of affection, veneration, and obligation to his accomplished master and dearest friend—feelings which throughout his life he retained with no diminished intensity. As he used himself to say, before he knew Professor Henslow the only objects he cared for were foxes and partridges.' I do not wish to overstate the facts. The possession of 'the collector's instinct, strong in Darwin from his childhood, as is usually the case in great naturalists,' to use Huxley's[8] words, would have borne its usual fruit in after life, in some shape or other, even if Darwin had not fallen into Henslow's hands. But then the particular train of events which culminated in the great work of his life would never have been started. It appeared to me, then, that it would not be an altogether uninteresting investigation to ascertain something about Henslow himself. The result has been to provide me with several texts, which I think it may be not unprofitable to dwell upon on the present occasion.

In the first place, what was the secret of his influence over Darwin? 'My dear old master in Natural History' ('Life,' ii, 317) he calls him; and to have stood in this relation to Darwin[9] is no small matter. Again, he speaks of his friend-

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[7] *Memorial Notices*, 13. [8] *Proc. R. S.*, xliv. vi. [9] As I shall have frequent occasion to quote the *Life and Letters*, I shall insert the references in the text.

ship with him as 'a circumstance which influenced my whole career more than any other' (i. 52). The singular beauty of Henslow's character, to which Darwin himself bore noble testimony, would count for something, but it would not in itself be a sufficient explanation. Nor was it that intellectual fascination which often binds pupils to the master's feet; for, as Darwin tells us, 'I do not suppose that anyone would say that he possessed much original genius' (i. 52). The real attraction seems to me to be found in Henslow's possession, in an extraordinary degree, of what may be called the Natural History spirit. This resolves itself into keen observation and a lively interest in the facts observed. 'His strongest taste was to draw conclusions from long-continued minute observations' (i. 52). The old Natural History method, of which it seems to me that Henslow was so striking an embodiment, is now, and I think unhappily, almost a thing of the past. The modern university student of botany puts his elders to blush by his minute knowledge of some small point in vegetable histology. But he can tell you little of the contents of a country hedgerow; and if you put an unfamiliar plant in his hands he is pretty much at loss how to set about recognising its affinities. Disdaining the field of nature spread at his feet in his own country, he either seeks salvation in a German laboratory or hurries off to the Tropics, convinced that he will at once immortalise himself. But '*cælum non animum mutat*'; he puts into 'pickle' the same objects as his predecessors, never to be looked at again; or perhaps writes a paper on some obvious phenomena which he could have studied with less fatigue in the Palm House at Kew.

The secret of the right use of travel is the possession of the Natural History instinct, and to those who contemplate it I can only recommend a careful study of Darwin's 'Naturalist's Voyage.' Nothing that came in his way seems to have evaded him or to have seemed too inconsiderable for attention. No doubt some respectable travellers have lost themselves in a maze of observations that have led to noth-

ing. But the example of Darwin, and I might add of Wallace, of Huxley and of Moseley, show that that result is the fault of the man and not of the method. The right moment comes when the fruitful opportunity arrives to him who can seize it. The first strain of the prelude with which the 'Origin' commences are these words: 'When on board H. M. S. "Beagle" as naturalist, I was much struck with certain facts in the distribution of the organic beings inhabiting South America.' But this sort of vein is not struck at hazard or by him who has not served a tolerably long apprenticeship to the work.

When one reads and re-reads the 'Voyage,' it is simply amazing to see how much could be achieved with a previous training which we now should think ludicrously inadequate. Before Henslow's time the state of the natural sciences at Cambridge was incredible. In fact, Leonard Jenyns,[10] his biographer, speaks of the 'utter disregard paid to Natural History in the University previous to his taking up his residence there.' The Professor of Botany had delivered no lectures for thirty years, and though Sir James Smith, the founder of the Linnean Society, had offered his services, they were declined on the ground of his being a Nonconformist.[11]

As to Henslow's own scientific work, I can but rely on the judgment of those who could appreciate it in relation to its time. According to Berkeley,[12] he was certainly one of the first, if not the very first, to see that two forms of fruit might exist in the same fungus.' And this, as we now know, was a fundamental advance in this branch of morphology. Sir Joseph Hooker tells me that his papers were all distinctly in advance of his day. Before occupying the chair of botany, he held for some years that of mineralogy. Probably he owed this to his paper on the Isle of Anglesey, published

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[10] *Memoir*, 175. [11] *Ibid.*, 37. [12] *Ibid.*, 56,

when he was only twenty-six. I learn from the same authority that this to some extent anticipated, but at any rate strongly influenced, Sedgwick's subsequent work in the same region.

Botanical Teaching.

Henslow's method of teaching deserves study. Darwin says of his lectures 'that he liked them much for their extreme clearness.' 'But,' he adds, 'I did not study botany' (i. 48). Yet we must not take this too seriously. Darwin,[13] when at the Galapagos, 'indiscriminately collected everything in flower on the different islands, and fortunately kept my collections separate.' Fortunately indeed; for it was the results extracted from these collections, when worked up subsequently by Sir Joseph Hooker, which determined the main work of his life. 'It was such cases as that of the Galapagos Archipelago which chiefly led me to study the origin of species' (iii. 159).

Henslow's actual method of teaching went some way to anticipate the practical methods of which we are all so proud 'He was the first to introduce into the botanical examination for degrees in London the system of practical examination.'[14] But there was a direct simplicity about his class arrangements characteristic of the man. 'A large number of specimens....were placed in baskets on a side-table in the lecture room, with a number of wooden plates and other requisites for dissecting them after a rough fashion, each student providing himself with what he wanted before taking his seat.'[15] I do not doubt that the results were, in their way, as efficient as we obtain now in more stately laboratories.

The most interesting feature about his teaching was not, however, its academic aspect, but the use he made of botany as a general educational instrument. 'He always held that a man of *no* powers of observation was quite an exception.'[16]

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[13] *Voyage*, 421. [14] *Memoir*, 161. [15] *Ibid.*, 39. [16] *Ibid.*, 163

He thought (and I think he proved) that botany might be used 'for strengthening the observant faculties and expanding the reasoning powers of children in all classes of society.'[17] The difficulty with which those who undertake now to teach our subject have to deal is that most people ask the question, What is the use of learning botany unless one means to be a botanist? It might indeed be replied that as the vast majority of people never learn anything effectively, they might as well try botany as anything else. But Henslow looked only to the mental discipline; and it was characteristic of the man and of his belief in his methods that when he was summoned to Court to lecture to the Royal family, his lectures 'were, in all respects, identical with those he was in the habit of giving to his little Hitcham scholars,'[18] and it must be added that they were not less successful.

This success naturally attracted attention. Botanical teaching in schools was taken up by the Government, and continues to receive support to the present day. But the primitive spirit has, I am afraid, evaporated. The measurement of results by means of examination has been fatal to its survival. The teacher has to keep steadily before his eyes the necessity of earning his grant. The educational problem retires into the background. 'The strengthening of the observant faculties,' and the rest of the Henslowian programme must give way to the imperious necessity of presenting to the examiner candidates equipped with at least the minimum of text-book formulas reproducible on paper. I do not speak in this matter without painful experience. The most astute examiner is defeated by the still more astute crammer. The objective basis of the study on which its whole usefulness is built up is promptly thrown aside. If you supply the apple blossom for actual description, you are as likely as not to be furnished with a detailed account of a buttercup. The training of observation has

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[17] *Memoir*, 99. [18] *Ibid.*, 149.

gone by the board, and the exercise of mere memory has taken its place. But a table of logarithms or a Hebrew grammar would serve this purpose equally well. Yet I do not despair of Henslow's work still bearing fruit. The examination system will collapse from the sheer impossibility of carrying it on beyond a certain point. Freed from its trammels, the teacher will have greater scope for individuality, and the result of his labors will be rewarded after some intelligent system of inspection. And here I may claim support from an unexpected quarter. Mr. Gladstone has recently written to a correspondent:—'I think that the neglect of natural history, in all its multitude of branches, was the grossest defect of our old system of training for the young; and, further, that little or nothing has been done by way of remedy for that defect in the attempts made to alter or reform that system.' I am sure that the importance and weight of this testimony, coming as it does from one whose training and sympathies have always been literary, cannot be denied.

Old School of Natural History.

If the old school of natural history of which Henslow in his day was a living spirit is at present, as seems to be the case, continually losing its hold upon us, this has certainly not been due to its want of value as an educational discipline, or to its sterility in contributing new ideas to human knowledge. Darwin's 'Origin of Species' may certainly be regarded as its offspring, and of this Huxley[19] says with justice: 'It is doubtful if any single book, except the "Principia," ever worked so great and rapid a revolution in science, or made so deep an impression on the general mind.' Yet Darwin's biographer, in that admirable Life which ranks with the few really great biographies in our language, remarks (i. 155): 'In reading his books one is reminded of the older naturalists rather than of the modern school of writers. He was a naturalist in the old sense of the word,

19 *Proc. R. S.*, xliv. xvii.

that is, a man who works at many branches of science, not merely a specialist in one.' This is no doubt true, but does not exactly hit off the distinction between the kind of study which has gone out of fashion and that which has come in. The older workers in biology were occupied mainly with the external or, at any rate, grosser features of organisms and their relation to surrounding conditions; the modern, on the other hand, are engaged on the study of internal and intimate structure. Work in the laboratory, with its necessary limitations, takes the place of research in the field. One may almost, in fact, say that the use of the compound microscope divides the two classes. Asa Gray has compared Robert Brown with Darwin as the 'two British naturalists' who have, 'more than any others, impressed their influence upon science in the nineteenth century.'[20] Now it is noteworthy that Robert Brown did all his work with a simple microscope. And Francis Darwin writes of his father: 'It strikes us nowadays as extraordinary that he should have had no compound microscope when he went his "Beagle" voyage; but in this he followed the advice of Robert Brown, who was an authority on such matters' (i. 145). One often meets with persons, and sometimes of no small eminence, who speak as if there were some necessary antagonism between the old and the new studies. Thus I have heard a distinguished systematist describe the microscope as a curse, and a no less distinguished morphologist speak of a herbarium having its proper place on a bonfire. To me I confess this anathematisation of the instruments of research proper to any branch of our subject is not easily intelligible. Yet in the case of Darwin himself it is certain that if his earlier work may be said to rest solely on the older methods, his later researches take their place with the work of the new school. At our last meeting Pfeffer vindicated one of his latest and most important observations.

The case of Robert Brown is even more striking. He is

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[20] *Nature*, x. 80.

equally great whether we class him with the older or the modern school. In fact, so far as botany in this country is concerned, he may be regarded as the founder of the latter. It is to him that we owe the establishment of the structure of the ovule and its development into the seed. Even more important were the discoveries to which I have already referred, which ultimately led to the establishment of the group of Gymnosperms. 'No more important discovery,' says Sachs,[21] 'was ever made in the domain of comparative morphology and systematic botany. The first steps towards this result, which was clearly brought out by Hofmeister twenty-five years later, were secured by Robert Brown's researches, and he was incidentally led to these researches by some difficulties in the construction of the seed of an Australian genus.' Yet it may be remembered that he began his career as naturalist to Flinder's expedition for the exploration of Australia. He returned to England with 4,000 'for the most part new species of plants.' And these have formed the foundation of our knowledge of the flora of that continent. Brown's chief work was done between 1820 and 1840, and, as Sachs[22] tells us, 'was better appreciated during that time in Germany than in any other country.'

Modern School.

The real founder of the modern teaching in this country in both branches of biology I cannot doubt was Carpenter. The first edition of his admirable 'Principles of Comparative Physiology' was published in 1838, the last in 1854. All who owe, as I do, a deep debt of gratitude to that book will agree with Huxley[23] in regarding it as 'by far the best general survey of the whole field of life and of the broad principles of biology which had been produced up to the time of its publication. Indeed,' he adds, 'although the fourth edition is now in many respects out of date, I do not

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21 *History*, 142. 22 *Loc. cit.*, 139, 140. 23 *Memorial Sketch*, 67.

know its equal for breadth of view, sobriety of speculation, and accuracy of detail.'

The charm of a wide and philosophic survey of the different forms under which life presents itself could not but attract the attention of teachers. Rolleston elaborated a course of instruction in zoology at Oxford in which the structures described in the lecture-room were subsequently worked out in the laboratory. In 1872 Huxley organised the memorable course in elementary biology at South Kensington which has since, in its essential features, been adopted throughout the country. In the following year, during Huxley's absence abroad through ill-health, I arranged, at his request, a course of instruction on the same lines for the Vegetable Kingdom.

That the development of the new teaching was inevitable can hardly be doubted, and I for my part am not disposed to regret the share I took in it. But it was not obvious, and certainly it was not expected, that it would to so large an extent cut the ground from under the feet of the old Natural History studies. The consequences are rather serious, and I think it is worth while pointing them out.

In a vast empire like our own there is a good deal of work to be done and a good many posts to be filled, for which the old Natural History training was not merely a useful but even a necessary preparation. But at the present time the universities almost entirely fail to supply men suited to the work. They neither care to collect, nor have they the skilled aptitude for observation. Then, though this country is possessed at home of incomparable stores of accumulated material, the class of competent amateurs who were mostly trained at our universities and who did such good service in working that material out is fast disappearing. It may not be easy indeed in the future to fill important posts even in this country with men possessing the necessary qualifications. But there was still another source of naturalists, even more useful, which has practically dried up. It is an interesting

fact that the large majority of men of the last generation who have won distinction in this field have begun their career with the study of medicine. That the kind of training that Natural History studies give is of advantage to students of medicine which, rightly regarded, is itself a Natural History study, can hardly be denied. But the exigencies of the medical curriculum have crowded them out: and this, I am afraid, must be accepted as irremediable. I cannot refrain from reading you, on this point, an extract from a letter which I have received from a distinguished official lately entrusted with an important foreign mission. I should add that he had himself been trained in the old way.

'I have had my time, and must leave to younger men the delight of working these interesting fields. Such chances never will occur again, for roads are now being made and ways cut in the jungle and forest, and you have at hand all sorts of trees level on the ground ready for study. These bring down with them orchids, ferns, and climbers of many kinds, including rattan palms, etc. But, excellent as are the officers who devote their energy to thus opening up this country, there is not one man who knows a palm from a dragon-tree, so the chance is lost. Strange to say, the medical men of the Government service know less and care less for Natural History than the military men, who at least regret they have no training or study to enable them to take an intelligent interest in what they see around them. A doctor nowadays cares for no living thing larger or more complicated than a *bacterium* or a *bacillus*.'

But there are other and even more serious grounds why the present dominance of one aspect of our subject is a matter for regret. In the concluding chapter of the 'Origin,' Darwin wrote; 'I look with confidence to the future—to young and rising naturalists.' But I observe that most of the new writers on the Darwinian theory, and oddly enough, especially when they have been trained at Cambridge, generally begin by more or less rejecting it as a theory of the origin of species, and then proceed unhesita-

tingly to reconstruct it. The attempt rarely seems to me successful, perhaps because the limits of the laboratory are unfavorable to the accumulation of the class of observations which are suitable for the purpose. The laboratory, in fact, has not contributed much to the Darwinian theory, except the 'Law of Recapitulation,' and that, I am told, is going out of fashion.

The Darwinian theory, being, as I have attempted to show, the outcome of the Natural History method, rested at every point on a copious basis of fact and observation. This, more modern speculation lacks. The result is a revival of transcendentalism. Of this we have had a copious crop in this country, but it is quite put in the shade by that with which we have been supplied from America. Perhaps the most remarkable feature is the persistent vitality of Lamarckism. As Darwin remarks: 'Lamarck's one suggestion as to the cause of the gradual modification of species—effort excited by change of conditions—was, on the face of it, inapplicable to the whole vegetable world' (ii. 189). And if we fall back on the inherited direct effect of change of conditions, though Darwin admits that 'physical conditions have a more direct effect on plants than on animals' (ii. 319), I have never been able to convince myself that that effect is inherited. I will give one illustration. The difference in habit of even the same species of plant when grown under mountain and lowland conditions is a matter of general observation. It would be difficult to imagine a case of 'acquired characters' more likely to be 'inherited.' But this does not seem to be the case. The recent careful research of Gaston Bonnier only confirms the experience of cultivators. 'The modifications acquired by the plant when transported for a definite time from the plains to the Alps, or *vice versa*, disappear at the end of the same period when the plant is restored to its original conditions.'[24]

Darwin, in an eloquent passage, which is too long for me

[24] *Ann. d. Sc. nat.*, 7e sér. xx. 355.

to quote,[25] has shown how enormously the interest of Natural History is enhanced 'when we regard every production of Nature as one which has had a long history,' and 'when we contemplate every complex structure....as the summing up of many contrivances.' But this can only be done, or at any rate begun, in the field and not in the laboratory.

A more serious peril is the dying out amongst us of two branches of botanical study in which we have hitherto occupied a position of no small distinction. Apart from the staffs of our official institutions, there seems to be no one who either takes any interest in, or appreciates in the smallest degree, the importance of systematic and descriptive botany. And geographical distribution is almost in a worse plight, yet Darwin calls it, 'that grand subject, that almost keystone of the laws of creation' (i. 356).

I am aware that it is far easier to point out an evil than to remedy it. The teaching of botany at the present day has reached a pitch of excellence and earnestness which it has never reached before. That it is somewhat one-sided cannot probably be remedied without a subdivision of the subject and an increase in the number of teachers. If it has a positive fault, it is that it is sometimes inclined to be too dogmatic and deductive. Like Darwin, at any rate in a biological matter, 'I never feel convinced by deduction, even in the case of H. Spencer's writings' (iii. 168). The intellectual indolence of the student inclines him only too gladly to explain phenomena by referring them to 'ism,' instead of making them tell their own story.

(To be Concluded)

SHORT ARTICLES.

DATES OF PUBLICATION OF NUTTALL'S COMPOSITÆ.—The most important of all earlier contributions to the knowledge of Northwest American Compositæ is Nuttall's elaborate

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25 *Origin*, 426.

paper published in the Seventh Volume of the Second Series of *Transactions of the American Philosophical Society.* The volume bears on its title page the date 1841; and this was, until recently, always given as the date of Nuttall's paper. But in 1891, Dr. Otto Kuntze found evidence, in some European libraries, that the document in question had been in the hands of botanists in 1840.

A copy of the whole volume, now in the botanical library of the Catholic University at Washington explains the matter fully, and removes all doubt about the date, or rather, dates, of Nuttall's Compositæ.

The entire volume was published originally in three parts; each part being issued in a paper cover, with title, and date.

Part I, issued in 1840, has a long table of contents, but nothing botanical.

Part II, also issued in 1840, contains a portion of the *Descriptions of New Species and Genera of Plants in the natural Order of the* COMPOSITÆ, *collected in a Tour across the Continent to the Pacific*, etc., by Thomas Nuttall.

Part III, issued in 1841, contains the remainder of the paper above-named.

The dates, according to the paging, are as follows:

Pages 283 to 356, 1840.
" 357 to 453, 1841.

EDW. L. GREENE.

ARCTOSTAPHYLOS ELEGANS, JEPSON.—This form, I now decide, is to be referred to *A. manzanita*, Parry. I do not regard it as even worthy of a varietal name and so make record for the benefit of monographers and others. The name was published in this journal for January, 1893. (Vol. i. p. 15).

OPEN LETTERS.

Distribution of the Darlingtonia in Oregon.

THE *Darlingtonia Californica* grows plentifully in the Coast Mountains about the 42d parallel. It is to be found in all of the spring runs and swamps and along creeks—in fact in all wet places for many miles and I think this is the home of it and that the upper Sacramento localities are outlying stations. Growing with it are a number of other plants not generally known to range out of California, such as *Parnassia Californica*, *Aster Hendersonii*, *Helenium Bigelovii*, *Rudbeckia Californica*, *Cypripedium Californicum*, *Scirpus criniger* and others that I cannot now call to mind.

The geological formation in the region is a peculiar kind of serpentine and, for the most part, the lower portions of the mountains are well supplied with springs that run clear water all the year.

Yours,

THOS. HOWELL.

Clackamas, Oregon, 16 October, 1895.

MISCELLANEOUS NOTES AND NEWS.

THE Setember number of the *Bulletin de L'Herbier Boissier* contains among other articles the last installment of G. Lindau's monograph of American Acanthaceæ, and "Herborisations au Cost Rica," by Ad. Tonduz.

IN *Garden and Forest* of April 3, 1895 (viii, 134, f. 20) Mr. T. S. Brandegee described and figured a new Mimulus, *M. Clevelandi*, from the south side of Cuyamaca Peak, San Diego Co. It is a perennial woody species spreading by underground roots and said to be one of the handsomest members of the genus.

H. MARSHALL WARD, Professor of Botany, Royal Indian Engineering College, London, has been appointed to the professorship of Botany in Cambridge University, made vacant by the death of Prof. C. C. Babington.

We have received a copy of Fascicle I of the Synoptical Flora of North America, issued October 10. A review will appear in our next number.

The Field Columbian Museum has begun a series of botanical publications. Vol. 1, part I, consists of a paper entitled "Contribution to the Flora of Yucatan," by Charles Frederick Millspaugh, Curator of the Museum.

The Botanical Society of North America held its first annual meeting at Springfield, Mass., August 27 and 28. Charles E. Bessey was elected President for 1896. M. S. Bebb, Rockford, Ill.; W. A. Setchell, Berkeley; W. R. Dudley, Palo Alto, California; and D. P. Penhallow, Montreal, were elected members. Dr. A. W. Chapman was elected to honorary membership.

The Division of Botany has recently distributed the following numbers of Vol. III, contributions from the U. S. National Herbarium: No. 3, "Flora of the Sand Hills of Nebraska, by P. A. Rydberg; No. 4, "Report upon a Collection of Plants made by J. H. Sandberg and assistants in Northern Idaho in 1892," by John M. Holzinger.

ERRATA.

Page 5, line 21, for Brittanicarum read Britannicarum.
" 11, " 14, " Callfornia read California.
" 11, " 21, " Ericamera read Ericameria.
" 14, " 12, " stoloniferous read stoloniferus.
" 17, " 1, " semicinecta read semicincta.
" 33, " 23, " Williamette read Willamette.
" 49, " 11, " Anlerson read Alderson.
" 59, " 30, " macrantherum read macranthum.
" 59, " 31, " macranthera read macrantha.
" 60, " 24, " Stiveri read Stiversi.
" 77, " 24, " differ read differs.
" 91, " 1, " far-wastern read far-western.
" 97, " 2, " Umbellaria read Umbellularia.
" 149, " 23, " Guadeloupe read Guadelupe.
" 150, " 21, " plans read plan.

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